IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication AUGUST 4, 1960

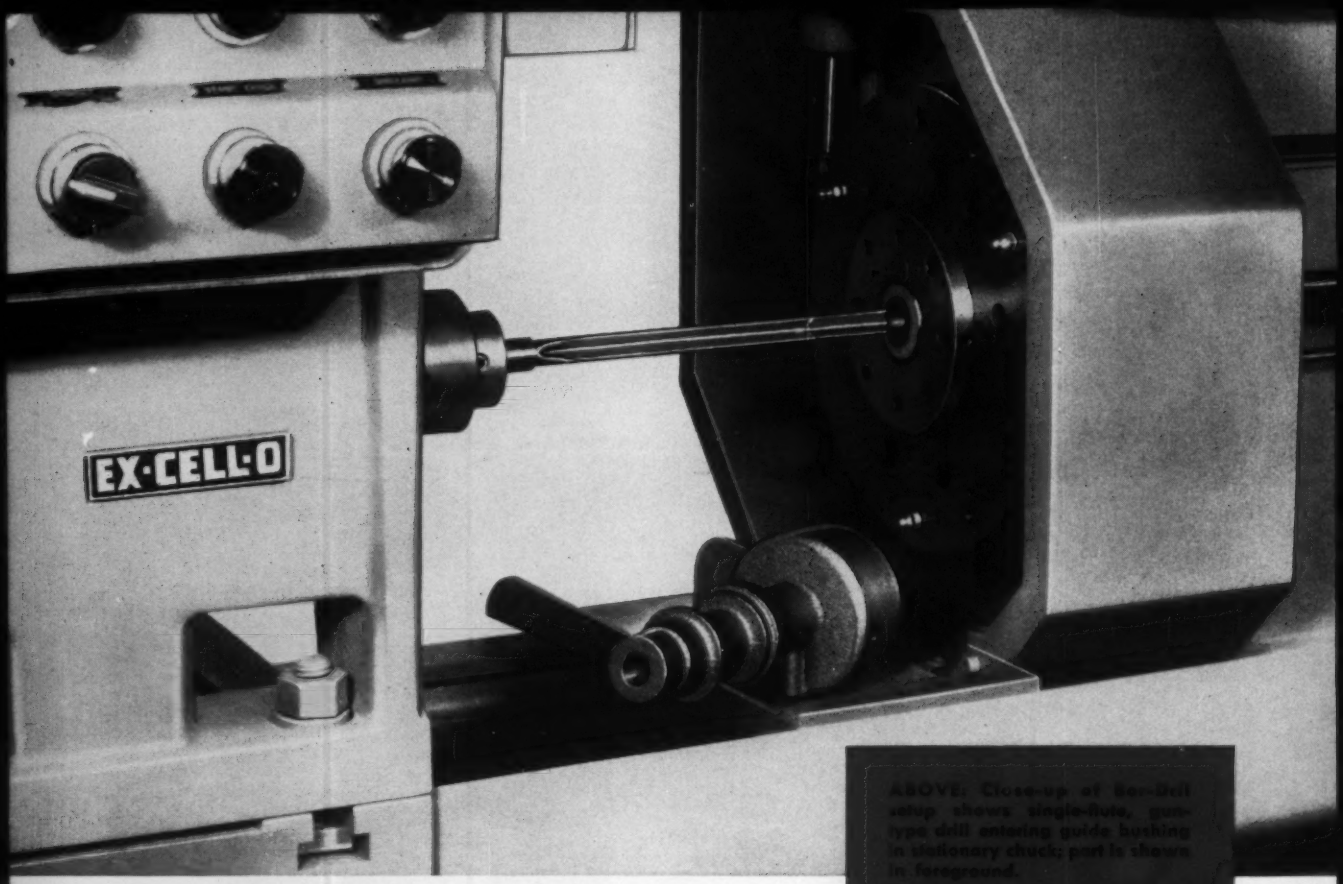
★ Leading P. A.'s Tell How To—

Team With Purchasing For More Profits p. 71

New U. S. Plants in W. Europe p. 76

An Answer to Rust Problems? p. 107

Digest of the Week p. 2-3



DEEP HOLES FROM THE SOLID, ROUND AND STRAIGHT WITHIN .001″

Bor-Drilled in 30 seconds!

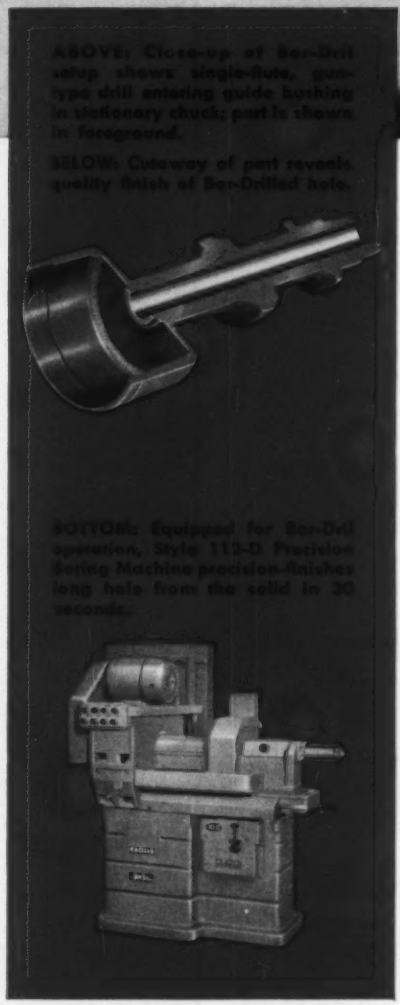
A cast-iron automotive distributor base in high production requires a central hole 6⅞″ deep by ⅝″ diameter. Hold both concentricity and diameter to .001″ tolerance; finish the I.D. to 15 RMS or better. *How many operations would you specify for the job—drilling, reaming, plus honing or lapping?*

Actually, your process sheet needs only one notation—*Bor-Dril!*

Bor-Drilling is Ex-Cell-O's method of producing accurate holes from the solid with standard or special Ex-Cell-O Precision Boring Machines. The process utilizes a rotating gun-type drill; chips are cleared out the single flute of the drill by high-pressure coolant oil fed through the Ex-Cell-O Precision Spindle.

Ask your Ex-Cell-O Representative about this faster, better way to get a finish-machined small hole 12″ deep or more *in one operation.* Or write direct for a free descriptive booklet on Bor-Drilling.

SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION



ABOVE: Close-up of Bor-Dril setup shows single-flute, gun-type drill entering guide bushing in stationary chuck; part is shown in foreground.

BELOW: Cutaway of part reveals quality finish of Bor-Drilled hole.

BOTTOM: Equipped for Bor-Dril operation, Style 112-D Precision Boring Machine precision-finishes long hole from the solid in 30 seconds.

MMT-PE

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DETROIT 32, MICHIGAN

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XLO

Machinery Division

59-22

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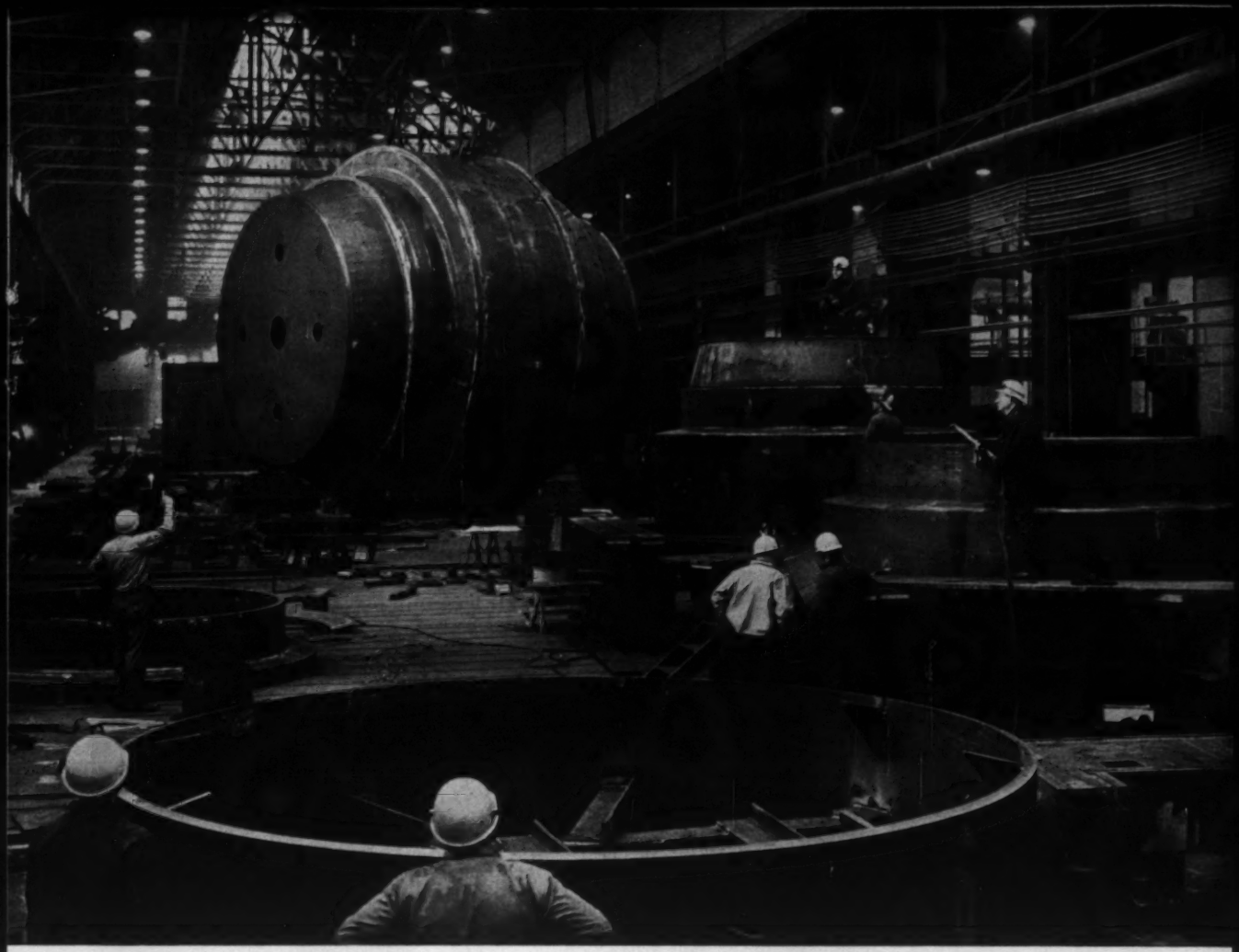

World's most powerful radio station requires 200-ton counterweights with steel plate shells

A giant metallic spider web, hung from 26 steel transmission towers almost 1,000 ft high, will be the heart of the world's most powerful radio station, reaching out to surface warships and missile-firing submarines in the North Atlantic. The $67-million, U. S. Navy communications center is located on a rockbound Maine peninsula.

For the vast antenna network to remain taut and operate efficiently, despite fluctuations in temperature or high winds, a system of thirty-six 200-ton counterweights is being installed. Specifications require that the steel plate counterweights be perfectly balanced and roll smoothly along their track sections.

The counterweight shells, each fabricated from 30 tons of steel plate, measure 12 ft wide across the flat ends, and 13½ ft in outside diameter. They are composed of three cylinders, four cone sections, two end plates, and two track sections. The largest cylinder is 2-in. plate, others are 4-in. plate, formed in half sections, then butt-welded together. When completed, they are filled with concrete to provide the necessary weight.

Replaceable wear tracks for each shell are made of 1-in. plate, 19-in. wide. Separate curved track sections, which fit into the concrete base of the giant towers, are also fabricated from Bethlehem plate 14-in. wide and 3-in. thick. The wear tracks will roll on these sections.

Bethlehem is also fabricating the steel yokes which straddle the counterweights and connect them to the cable system. These yokes, each weighing 7½ tons, are constructed mainly of 1-in.-thick plate and are of all-welded construction.

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The IRON AGE

August 4, 1960—Vol. 186, No. 5

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★Starred items are digested as right.

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STEEL EARNINGS NOSEDIVE

Second Quarter Decline — Reflecting the downturn in steel sales, industry profits fell sharply in the

second quarter. Industry leaders still moderately optimistic about outlook for the year. P. 74

HIGHER TARIFFS?

More Protection—Metal men will tell the Tariff Commission that higher tariffs are needed to protect them from the rising rate of foreign competition. P. 75

COMMON MARKET

What's Happening — Alfred Barth, of the Chase Manhattan Bank, tells what metalworking companies are investing in the European Common Market, and why. This is Part 2 of a two-part series. P. 76

AUTOMOTIVE

A Smoother Run — Because of long range planning several years

Metalworking

Cover Feature

Teamwork is Key—Kenneth R. Geist, (right), director of purchasing, Allis-Chalmers Mfg. Co., meets with other department heads. Mr. Geist is one of purchasing executives showing way to better buying. P. 71

ago, most auto manufacturers are taking changeovers in stride this year. P. 85

WASHINGTON

The Political Ring — With the conventions over, attention is being focused on the Capitol. Campaign fights are expected to be raised on the floor of Congress with major bills as the weapons of war. P. 89

Engineering-Production Developments

METAL CORROSION

A New Theory—Everyone is familiar with rust. It affects industry in many ways. In the United States alone, the corrosion of iron wastes an estimated $6-7 billion per year. A new theory for rusting has been advanced. The true culprits appear to be hydrogen ions. These ions also form one of the basic building blocks of matter. P. 107

CHEMICAL ANALYSIS

Without Altering Work Flow—An X-ray gage promises to move industrial chemistry from the lab to the production line. This gage checks the presence and amount of up to five elements with a reference. Six elements can be checked without using the reference. P. 110

SHELL-MOLD PROCESS

For Large Steel Castings—Mention the shell-mold process and industry usually thinks of small, close-tolerance castings. But, experience at one foundry shows how the process can work for large castings too. Result: Shell-molded steel castings weighing more than 200 lb—on a production basis. P. 112

PLANNED PROFITS

Gage Capital Evaluation—Simple ratios and charts give economic meaning to isolated changes in a company's operations. They blend production needs with a sound state of financial health. P. 114

SPEED BORING MILLS

With Fingertip Controls—A new series of horizontal boring mills can be controlled by only two fingers. This adds to production efficiency. Another feature is infinitely variable feed rate—which can be altered while cutting. P. 118

Market and Price Trends

REPORT TO MANAGEMENT

How Platforms Compare — Now that the conventions are over, the economic platforms of the two major parties can be compared. Here's how Democrats and Republicans view key business issues. P.83

WEST COAST

Russian Jet Competition?—U. S. aircraft makers worry that the USSR may be first in the air with a 2000-mph jet transport. P. 93

MACHINE TOOLS

Atomic Automation — Automation has started its inroad into the field of atomic equipment making. This should mean a new and lucrative area for makers of automated machines and equipment. P. 91

STEEL SUMMARY

Upturn Coming — Order rate is beginning to show signs of life and will pick up steam in the next few weeks. But it won't be as big as expected. P. 141

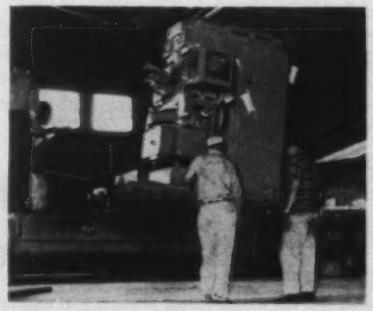
PURCHASING

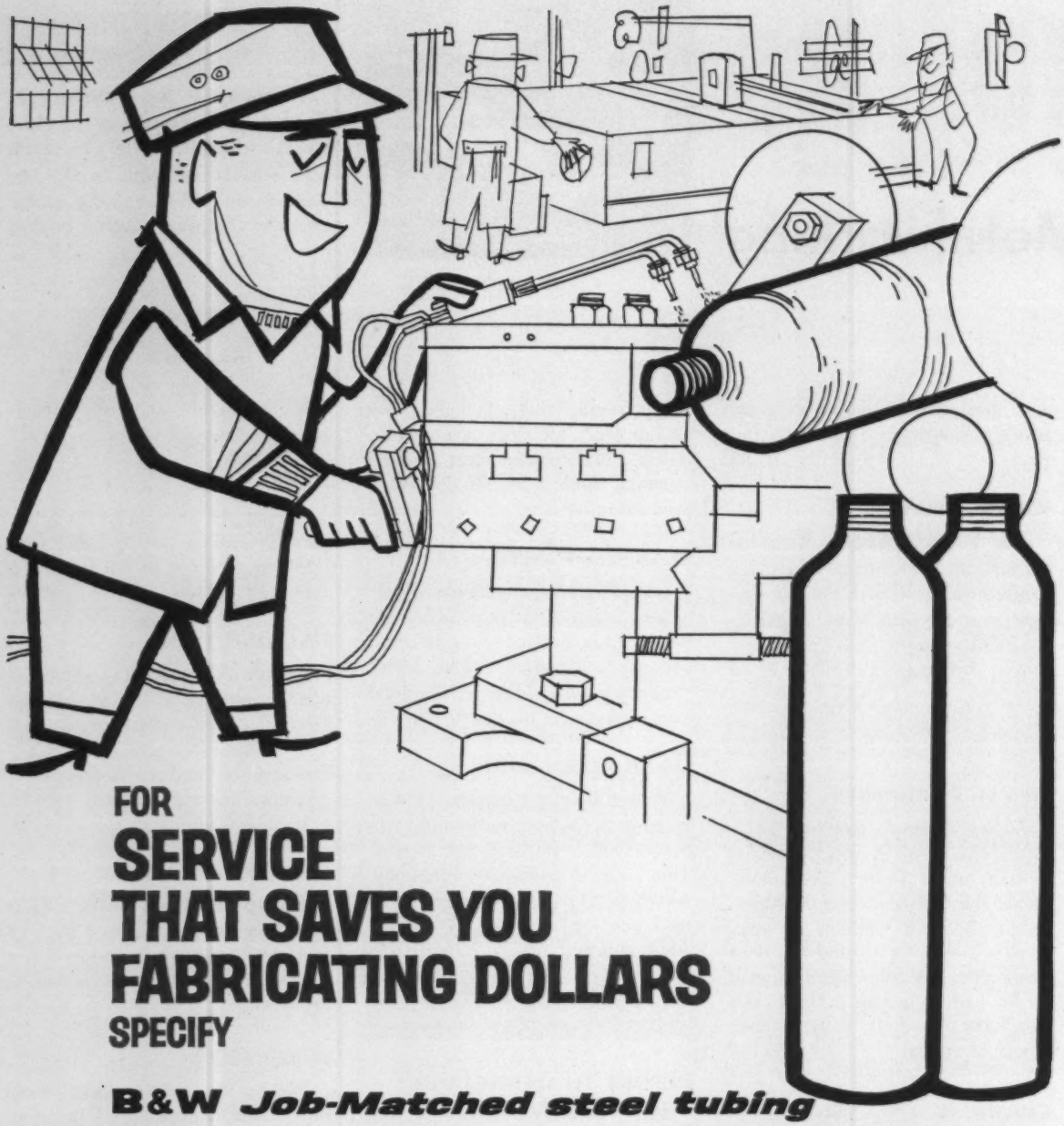
Which Way For Prices?—Both buyers and manufacturers are pondering the question of press prices. Some say the next six months will see a drop. P. 142

NEXT WEEK

MODERN MACHINE TOOLS

1960 Exposition—"Modern Machine Tools Equal Production Efficiency." That's the theme of the Machine Tool Exposition. It will be the first time since 1955 in which virtually the whole U. S. machine tool industry shows its products.





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This belt lived 3 lives before accident killed it off

THE conveyor belt previously used in this foundry lasted only a year, had to be repaired frequently. The intense heat blistered and scorched it, hardened and cracked the rubber.

When a B.F.Goodrich distributor heard of the problem, he recommended a BFG belt that was specially developed for carrying hot materials. This belt is made with a heat-resisting rubber that can stand temperatures that char or burn ordinary rubber belts.

The B.F.Goodrich hot-material belt lasted three years—two years longer than the belt it replaced. Even then, it was an accident, not heat prostration, that killed it off. As the head of plant maintenance put it: "No one knows how long this belt might have lasted if it hadn't been accidentally ripped."

In this foundry, the purchasing agent had a good rule. Instead of accepting the high cost of frequent replacements, he called in a BFG distributor and found exactly what he needed to keep the plant running with fewer shutdowns and delays.

Your B.F.Goodrich distributor has the exact specifications for the belt described here. And, as a factory-trained specialist in rubber products, he can answer your questions about the many products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Dept. M-851, Akron 18, Ohio.*

B.F.Goodrich

CONVEYOR BELTS

NEW! WARNER & SWASEY'S O-AC Single Spindle Chucking Automatics designed to automate the production of small precision parts...hold exceptionally close tolerances...set up fast on small lots

The Global Picture: It's Our Number One Problem

The international picture is far from bright. It is darker than at any time in years. Yet this is no time for alarm.

But it is time to realize the job our next President faces. It is also time for us to read every scrap of information that bears on the global capabilities of each candidate.

Certainly he must be mature about South America, Africa, Asia, Russia and China. But being mature doesn't necessarily mean he will know what to do about these problems.

When he does figure out what to do, he will have to assert the leadership to take the people and Congress along with him. So we must look at the candidates and see which one we think has the will—and the stamina—to lead.

But again, being a leader isn't quite enough. He must know what to do about defense. Mere spending by using a magic figure means nothing. We must have the best that money can buy. And in spending more, our next President should keep the bureaucrats from sending billions down the drain because of stupidity, inefficiency and inexcusable waste.

To do what is right in the international arena the successful candidate must carry out sensible and sound domestic policies. So we must search for and ferret out what each candidate is likely to do. It will take sound and well-balanced domestic policies to maintain our nation militarily strong.

We don't care for a candidate who is likely to have us "moved" by slogans, special deals, and further concentration of power—in the wrong place. We must know if our candidate will do what is right internationally—not what is merely expedient.

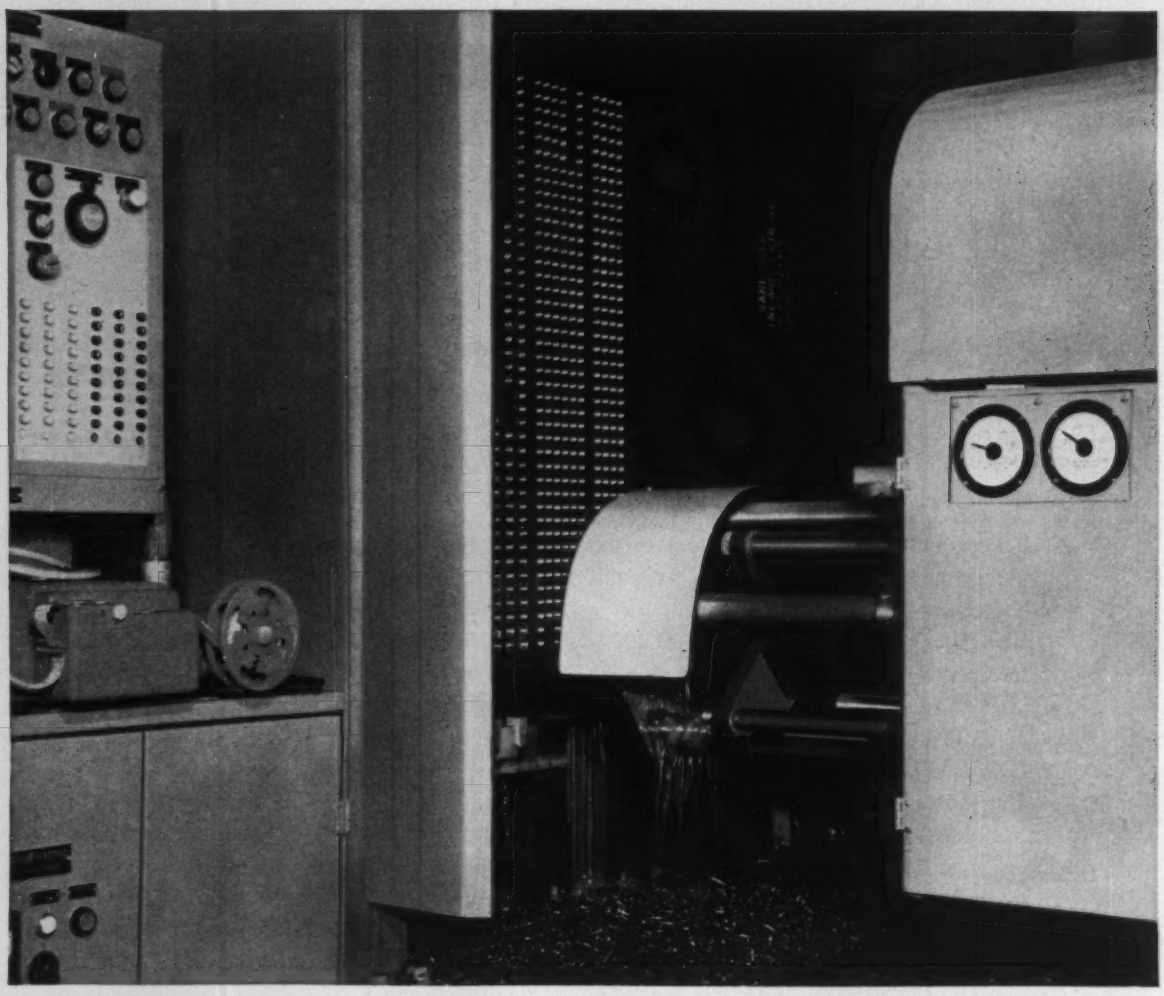
Our next President must get along with Congress. But he doesn't have to be subservient. When it comes to trying to save the world there is a law of diminishing returns. Beyond that we could become a gigantic global spreader of insufficient help for any one project, nation or people.

When we study our candidate, let's make sure he does place emphasis on the international picture. Let's make sure, too, that he will know what to do and how to do it.

Then, before we choose our man, we should be satisfied that he knows that a sound and sensible domestic economy is a prerequisite for any global pattern of action we might take.

Tom Campbell

Editor-in-Chief



"40 IPM AT *875 rpm*... WE WERE AMAZED"/ *says Walter P. Hill*

DATA:	1020 LEDLOY LEADED PLATE 1½" THICK	1020 NON-LEADED PLATE 1½" THICK
PENETRATION RATE Production Run	40 IPM	20 IPM
DRILL SPEED Production Run	875 RPM	750 RPM
MAXIMUM IPM Test Run	up to 47	up to 28
CHIP CHARACTERISTICS Thickness Temperature Type	.060—.080 cool broken	.040—.060 cool curled

"Ours is a specially designed numerically controlled jig drilling machine with which we obtained penetration rates of 20 Inches Per Minute at 750 RPM in standard half-inch thick 1020 steel plate. However, with the same set-up, we easily obtained 40 IPM at 875 RPM in INLAND LEDLOY leaded steel plate three times as thick and with far better tool life.

■ "Actually, in LEDLOY, we reached penetration rates of 46 and 47 IPM but consider the 40 IPM more practical for production runs. Our programmed test run was made on steady plates for large condensors in which 1½" LEDLOY steel plates were used. As a control, equivalent drillings were made in non-leaded plates of the same chemistry and the same thickness. Our load meter showed the same pulled load on LEDLOY at 40 IPM as we pulled on the non-leaded plate at 20 IPM. Tool life using LEDLOY plates at 40 IPM was equal to tool life using non-leaded plates at only 20 IPM.

■ "We conclude, and without hesitation state, that LEDLOY displayed a marked improvement."

Walter P. Hill, President
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New Mixer for Solid Fuel

Automation of plastics and chemicals industries is speeding production of missile propellants. Prime example is a new mixer for continuous metered flow of high-energy solid fuel. Equipment borrowed successful design ideas from other fields. It's cutting labor costs from 18¢ per pound to 3¢; is far safer and will eliminate the inefficient batch method of processing.

Process Forms Tiny Parts

A new precision-forming process combines the advantages of investment castings with those of other precision methods—such as coining, cold forming and sizing. Investment castings form miniature precision shapes to initial tolerances of ±0.005 in. per in. Then the shapes are subjected to follow-up operations. As a result, critical dimensions on small parts can be held within ±0.001 in. per in.

Measures Highest Vacuum

A new ultra-high vacuum, cold cathode ionization gage with transistorized controls handles pressures down to the 10^{-14} mm Hg range. It will be used for vacuum research in solid state physics, metallurgy, and thermo-nuclear power.

Washes Clay from Iron Ore

A simple washing process developed by the Bureau of Mines for treating certain ores from Alabama iron deposits has proven commercially feasible. The process removes a clay-like material from the ore to provide a high-quality concentrate for blast furnace operations.

Extruded Auto-Bumpers

A process using hot aluminum extrusions instead of cold sheet metal during forming is expected to attract the interest of automakers—especially for bumper making. The extrusion is heated to about 1000°F. and then transferred to heated dies. One stroke of the press forms all major configurations. After quenching to room temperature, mounting holes are punched and bumper ends cut to proper shape. Finally, it's heat treated for hardness, buffed and anodized.

Tape-Controls for the Atom

With one of the major atomic power equipment producers going all out for automation, in both paperwork and manufacturing operations, look for concerted efforts to make atomic energy competitive. High cost of equipment is a prime obstacle. Experts say this field is a natural for tape-controlled machine tools. They can do much to cut unit costs.

Wire Coating Aids Adhesion

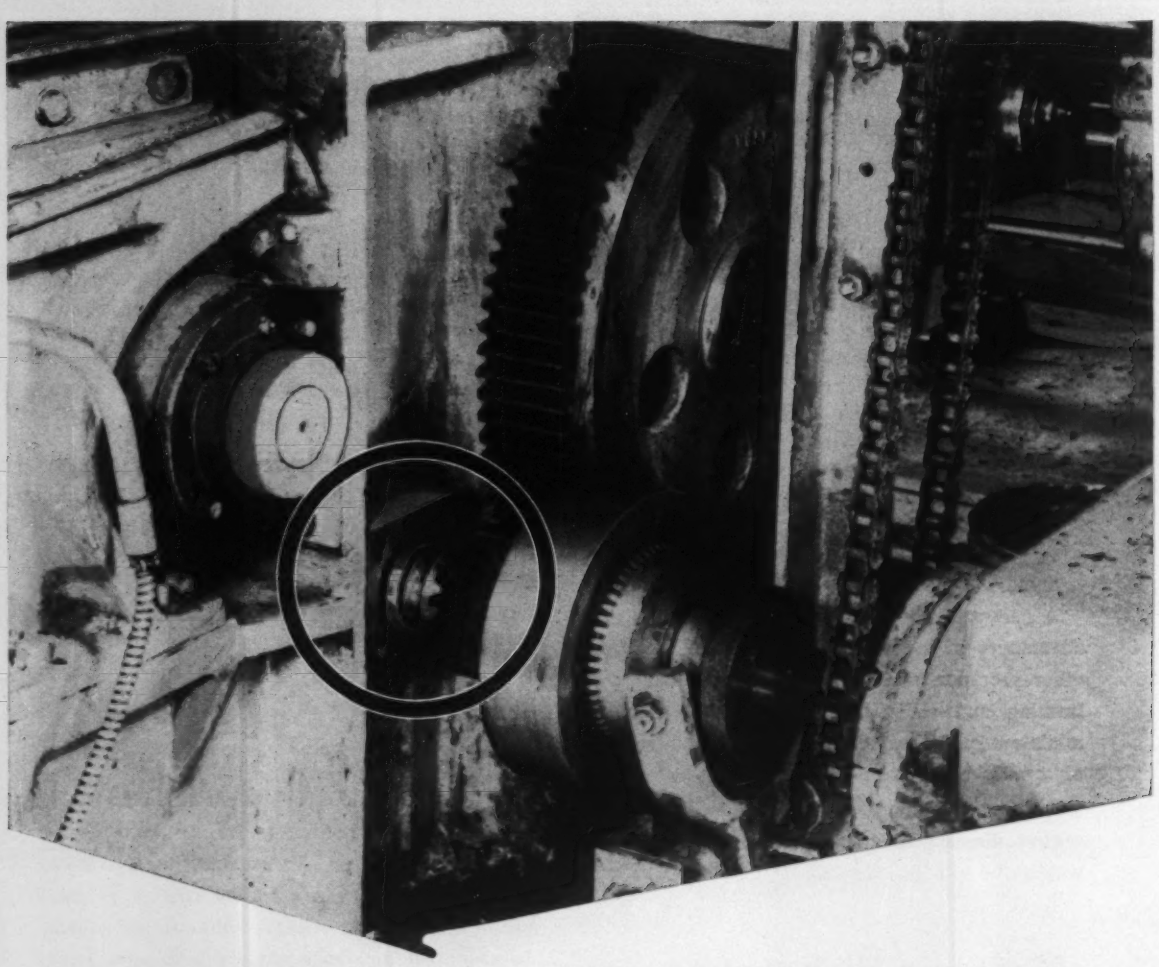
A new high-carbon steel wire for rubber reinforcing is announced by National Standard Co., Niles, Mich. The wire's special coating of zinc and brass is said to increase adhesion and widen the compounding range. Available in sizes from 0.012 to 0.050 in., it's a strong possibility for use with high-pressure hose.

Plastic Screws Wear Well

Engineers at Pam-Pro Plastics, Menlo Park, Calif., have developed a new process for molded and machined screws and nuts. The fiber glass fasteners are said to hold up well after repeated use. Major uses include, missiles, rockets and areas where heat and wear resistance are prime factors.

Speeds Charging Process

Materials handling is shaping up as the number one problem in the steel industry's drive to speed production. As a means of getting materials into openhearths faster, one shop is going to a system of charging directly from rail cars. Heavier cranes, computer studies and other means are being used elsewhere to speed material flow.



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The original bearings on the pinion drive of this corrugating machine had an average life of only three months. Our customer had been advised that only a complete engineering change of machine drive would solve the problem.

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LETTERS FROM READERS

Nonpartisan

Sir—We greatly appreciated reading your editorial of July 14 under the subject of "Our Next President: Lord Have Mercy on Him." This is a good nonpartisan editorial which we feel should receive some additional circulation. We would like to have your permission and authorization to reprint it in the "ESCO LADLE" so that it will be received and read by all our employees scattered throughout the United States and Canada. Quite a few of our customers and suppliers also read the "ESCO LADLE." We would expect to have it published in either the September or October issue, prior to the November election.—D. R. Babbitt, Electric Steel Foundry Co., Danville, Ill.

■ **You certainly do have our official okay to reproduce this editorial as requested.—Ed.**

Editorial Reader

Sir—I have always been interested in reading your editorial column, but have never written to express my appreciation before this. However, the recent one entitled "Our Next President: Lord Have Mercy on Him" is such an excellent one and so appropriate at this time, I do want to say thank you ever so much for a job well done. I have taken the liberty of calling it to the attention of our local paper with the hope that it receives a wider coverage so that the feminine section of our voting public may read your editorial comments at this important time in our national life.—Mrs. Joseph F. Weidel, Natrona Heights, Pa.

Fine Series

Sir — Congratulations on your fine 1960 Metalworking Dollar Series. Part of that series, "How to Get More for Your Metalworking Dollar" is of special interest to us, most particularly the electroplated, prefinished metals. Would it be possible to get 25 reprints of this article? We are subscribers of your magazine and give it complete circulation among our department heads.—Robert E. Littaus, National Sheet Metal Co., Peru, Ill.

■ **Reprints are on the way.—Ed.**

Wants Copies

Sir—We have read with great interest your special feature of June 30 concerning "Metallic Coatings." We would appreciate receiving ten copies of this special feature at your earliest convenience.—R. R. Miller, Jr., Pittsburgh Steel Co., Pittsburgh, Pa.

■ **As requested, the copies will be sent.—Ed.**

Dropped Zero

Sir—On p. 62 of your July 7 issue is an article about our new office building in Glassport, Pa. It is the last story on this page. The figure shown is $25,000, whereas the figure we released was $250,000. You can't get much of an office building today for $25,000.—Albert Teifeld, Copperweld Steel Co., Pittsburgh, Pa.

■ **Right, we dropped a zero. You don't even get much house these days for $25,000.—Ed.**

"I don't know where I'd be without you, Miss Young—President of the company, I suppose."

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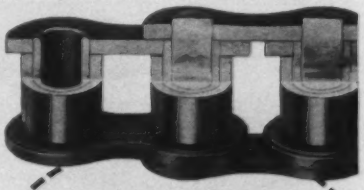
WEARING SURFACES
for longer chain life



ACME'S SECRET
for years of additional service

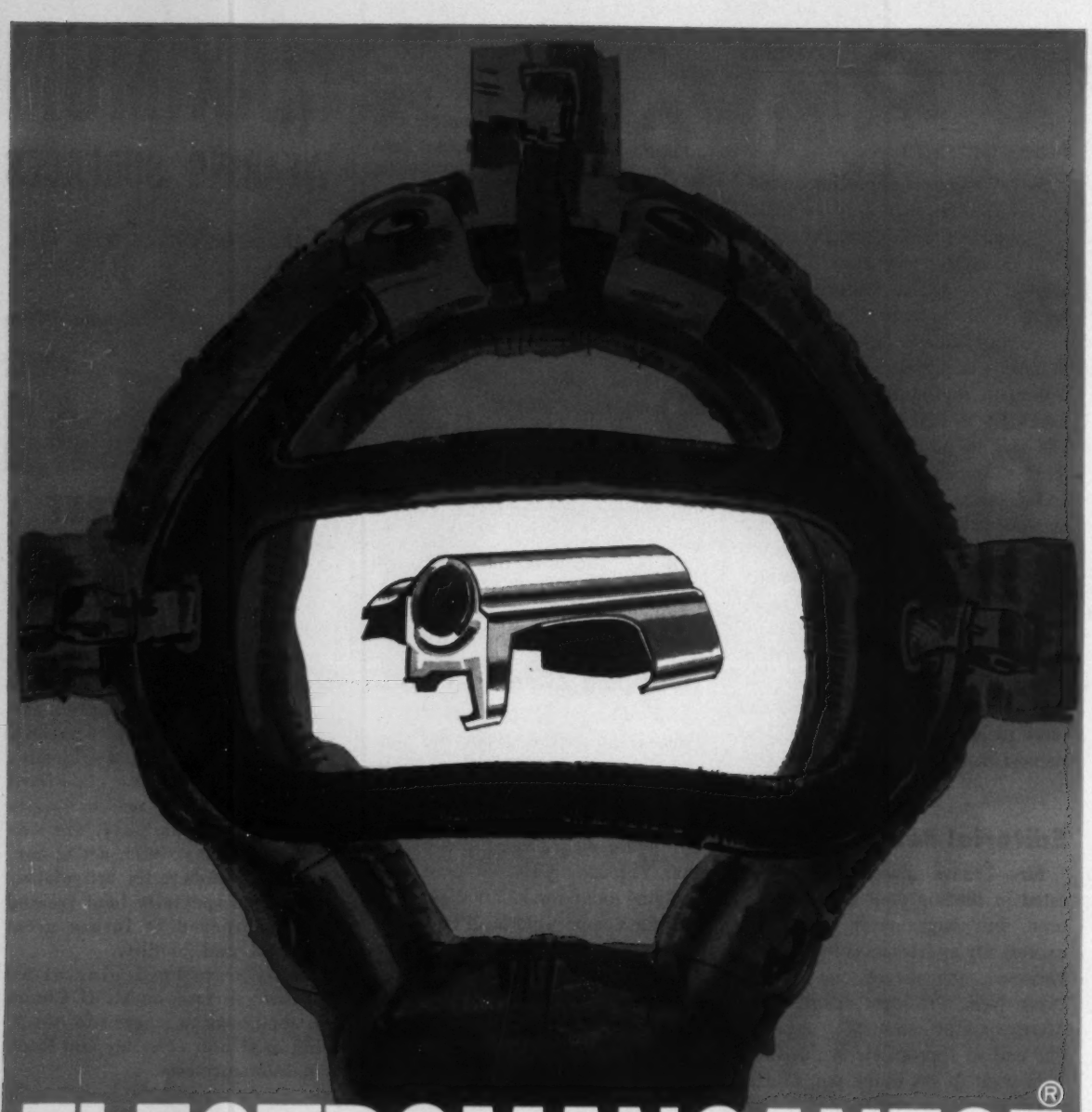
Special hardening of pins, bushings and rollers help insure maximum life expectancy of ACME Roller Chains. All parts subjective to articulation have glass-hard wear-resistant surfaces to render eminent life expectancy. The side plates or links which act as connecting members for articulating parts are specially heat treated and tempered to insure great strength and ductility.

Maximum hardening of all wearing surfaces on ACME Chains is conducive to longer life, resulting in greater economy and lower maintenance cost.

Your local distributor has a complete line of ACME Chains and Accessories on hand for immediate delivery. Call him.

Write Dept. 21-L for new 100-page Illustrated Catalog, including new engineering section showing diagrams of 36 methods of chain driving.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS



ELECTROMANGANESE®

PROTECTS DEEP DRAWING STEELS

FOOTE MINERAL COMPANY

Protect deep drawing steels from the harmful effects of carbon, silicon, and other impurities by standardizing on pure manganese—ELECTROMANGANESE. Get facts and prices by writing for Bulletin 201 to Technical Literature Section, Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pennsylvania, or Box 479, Knoxville 1, Tennessee.

FATIGUE CRACKS

Expert View

This week Alfred W. Barth, administrative head, International Dept., Chase Manhattan Bank, discusses numbers and types of American metalworking firms investing heavily in the European Common Market area.

This is the second part of a two part series dealing with the importance of the ECM to American investors. Last week's article, dealing with the challenge and opportunity of investing in the ECM, was authored by David Rockefeller, vice chairman of the board of directors of the bank.

The Early Years — Mr. Barth, who was born and educated in Switzerland, is a well known figure in the banking and foreign investment world. He attended the Commercial School of the Swiss Mercantile Society, Zurich, while serving three years apprenticeship in the

Alfred W. Barth

export-import business in Switzerland. He came to New York in 1921 and joined the foreign department of Stern Bros. department store.

Two years later he joined the Equitable Trust Co. This was the beginning of his climb in the banking field. Since then he has held a number of top level posts that eventually led to his current position.

High Honor—In recognition of his work as the chief negotiator of a $225 million loan to France in 1950, jointly managed by Chase Manhattan and J. P. Morgan & Co., Inc., he was awarded the French Legion of Honor.

In addition to his banking duties, Mr. Barth is a director of several companies engaged in foreign trade. Included are Chase Manhattan Overseas Corp. and Compagnie International de Grands Magasins, Tangiers, Morocco.

For Mr. Barth's interesting and highly informative story on the ECM, turn to p. 76.

Computerese

Are you having a hard time being understood when you get around the computer crowd? Are you having a hard time understanding them? If you are, your problem of being socially insecure may be over. Minneapolis - Honeywell Regulator Co. has come out with a new dictionary that is guaranteed to make you feel like one of the gang.

It contains 82 definitions that come up often when computers or people who work with them get together. Of course, you'll have to forget some meanings for words you've been using for years and substitute them with new ones. But after all, it's getting the message across that's important. Here are some helpful, everyday, examples.

Fond Adieu—No longer is an "address" the phone number of your favorite redhead. It's "A label that identifies for the computer a specific location in its memory where certain information is stored."

And "overflow" doesn't mean the point where you shout, "When!" It means, of course, "The result of an arithmetic operation that exceeds the capacity of the number representation in a digital computer."

WANT RELIABLE HYDROSTATIC TESTING TO 50,000 PSI?

Aldrich Air-Driven Hydraulic Pumps are rugged, compact... the perfect answer for production or laboratory needs . . . Operate on normal plant air... Immediate shipment from factory stock.

FOR HIGH PRESSURE VESSELS—Maker of unfired pressure vessels tests production units with Aldrich air-driven hydraulic pump, in accordance with A.S.M.E. Boiler and Pressure Test Code.

OR CASTINGS—Castings and forgings for missile, nuclear, and other industries are tested in this rig on a production-line basis. Source of hydraulic pressure is an Aldrich pump. This unit has capacity of 12,100 psi. Other pumps available for pressures to 50,000 psi. Special units to 100,000 psi.

Aldrich air-driven hydraulic pumps are dependable, economical to operate and easy to install. Write today for Data Sheet 36 (6-inch stroke) or Data Sheet 36A (3-inch stroke).

ALDRICH

ALDRICH PUMP COMPANY

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HUSSEY COPPER

Quality Controlled

from mine to user

A red hot copper cake leaves the furnace for the break-down mill at Hussey.

UNIFORMITY

Hussey constant quality controls produce a uniform quality in copper you can depend on in both physical properties and dimensional accuracy.

CONTROLLED TEMPER

Grain size and degree of temper is closely maintained to assure no significant variance from lot to lot or year to year.

MINIMUM TOLERANCES

Dimensional tolerances on length, width, thickness, straightness and flatness are held to the minimum at all times and produced especially to customer specifications.

FLAWLESS

The surface finish and internal structure of Hussey Copper is maintained flawless by constant inspection.

THE EXTRA INGREDIENT

Hussey Copper is produced by the unique combination of the most modern technology and the personal attention of skilled craftsmen. To be sure—make sure you order Hussey Copper.

COPPER HUSSEY BRASS

MADE IN U.S.A. TO THE STANDARDS OF AMERICAN INDUSTRY

C. G. HUSSEY & COMPANY

(Division of Copper Range Co.)

Rolling Mills and General Offices

PITTSBURGH 19, PENNSYLVANIA

COMING EXHIBITS

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago (National Machine Tool) Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago, (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Coliseum Machinery Show — Sept. 7-15, Chicago. (Contact: A. B. Perkins, 2216 South Hill St., Los Angeles 7, Calif.)

Iron & Steel Show — Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals, Metals Park, Novelty, O.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

SEPTEMBER

American Machine Tool Distributors Assn.—Annual meeting, Sept. 3-4, LaSalle Hotel, Chicago, Association headquarters, 1500 Massachusetts Ave., N. W., Washington 5, D. C.

Assn. of Lift Truck & Portable Elevator Mfrs.—Fall meeting, Sept. 12, The Cavalier Club, Virginia Beach, Va. Association headquarters, One Gateway Center, Pittsburgh 22, Pa.

Electronic Industries Assn. — Fall conference, Sept. 13-16, French Lick-Sheraton, French Lick, Ind. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

American Die Casting Institute—Annual meeting, Sept. 14-16, Edgewater Beach Hotel, Chicago, Institute headquarters, 366 Madison Ave., New York.

National Foundry Assn. — Annual meeting, Sept. 22-23, Edgewater Beach Hotel, Chicago. Association headquarters, 53 W. Jackson Blvd., Chicago.

Porcelain Enamel Institute, Inc.—Annual meeting, Sept. 25-28, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

Farm Equipment Institute—Annual convention, Sept. 25-28, The Statler Hilton Hotel, Dallas, Tex. Institute headquarters, 608 S. Dearborn St., Chicago.

American Welding Society — Fall meeting, Sept. 26-30, Pittsburgh. Society headquarters, 33 West 39th St., New York.

OCTOBER

Metal Lath Mfrs. Assn.—Fall meeting, Oct. 6-7, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters, Engineers Bldg., Cleveland.

The Electrochemical Society, Inc.—Fall national meeting, Oct. 9-13, Shamrock Hotel, Houston, Tex. Society headquarters, 1860 Broadway, New York.

American Gas Assn.—Annual convention, Oct. 10-12, Atlantic City. Association headquarters, 420 Lexington Ave., New York.

Pressed Metal Institute — Annual meeting, Oct. 10-14, Shawnee Inn, Shawnee-On-Delaware, Pa. Institute headquarters, 3673 Lee Rd., Cleveland.

Marking Device Assn. — Annual convention, Oct. 12 - 14, Hotel Roosevelt, New York. Association headquarters, 912 Chicago Ave., Evanston, Ill.

Steel Boiler Institute, Inc. — Fall meeting, Oct. 12-14, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1308 Land Title Bldg., Philadelphia.

Here's why we're up to our ears in screws!

...SOUTHERN SCREWS

A stock of 1,500,000,000 fasteners is a whale of a lot of screws, bolts and nuts. Why maintain such a huge stock? Why mention it in our ads?

The reason 1,500,000,000 fasteners are stocked in Southern Screw's Statesville plant is to let you know that regardless of the size, head style, materials or finish of the standard fasteners needed for profitable assembly in your plant, Southern carries them in stock. This means that your order, large or small, can be on its way to you within hours after it is received, if you request rush service.

And you can be sure that the Southern fasteners you order are quality fasteners made with the know-how that comes from nearly 15 years of specialization in fasteners exclusively.

YOU are the reason we are up to our ears in fasteners! Southern makes them for you, stocks them for you. We are ready—today—to fill your order, whether for standards or for specials. Ask your local Southern distributor for our current Stock List or write direct to: Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

Manufacturing and Main Stock in Statesville, North Carolina

Warehouses: New York • Chicago • Dallas • Los Angeles

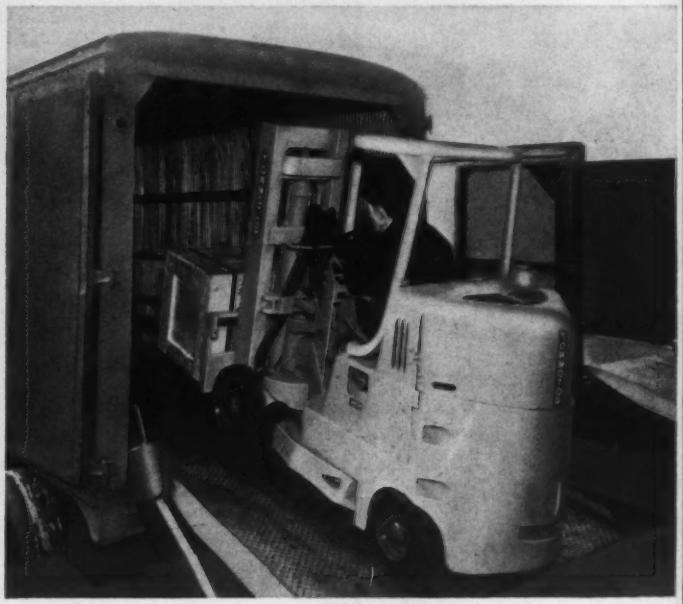
Machine Screws & Nuts • Tapping Screws • Stove Bolts • Drive Screws • Continuous Threaded Studs • Carriage Bolts • Wood Screws

Southern SCREW COMPANY STATESVILLE • NORTH CAROLINA

1. Performs like a regular fork lift truck . . .

2. Stacks *left* 90° in narrow 6′ aisles . . .

3. Stacks *right* 90° in same narrow aisles . . .



4. Drives loads into trailers and boxcars!

One truck . . . one operator . . . does all this!

(Only the new Towmotor "Naro-Aisle-Stack" Truck can!)

- **Only truck of its kind for narrow 6-foot aisle stacking**
- **One lift truck does the work 3 trucks usually do**
- **Makes 36.5% of "lost" space usable in average plant**

Amazing performance? You can't imagine what the "Naro-Aisle-Stack" lift truck will do until you actually see it . . .

See how it pivots loads a full 180° because it's equipped with hydraulic outriggers. See how it stacks materials left or right 90° and picks up loads from the same extreme angle. See how it also performs all other functions of regular fork lift trucks.

Most spectacular of all is the way it performs within the confines of narrow, six-foot aisles—enabling you to utilize storage space you considered "lost"!

Such unique operation is made possible only because "Naro-Aisle-Stack" trucks are equipped with *Towmotor Towmostatic Drive* — the only drive of its kind that eliminates clutch, transmission, drive line, differential and shifting mechanism.

Ask for booklet, "Captures Lost Space," describing the new series. Write Towmotor Corporation, Cleveland 10, Ohio.

New Naro-Aisle-Stack Trucks made only by . . . TOWMOTOR THE ONE-MAN-GANG® - GERLINGER

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

THIS STEELMARK

IDENTIFIES PRODUCTS MADE

OF MODERN RELIABLE STEELS

Use This Mark On Your Products

...Look For It When You Buy

WYCKOFF STEEL COMPANY SPECIALISTS IN QUALITY COLD FINISHED STEELS FOR OVER 40 YEARS

Pittsburgh 30, Pa.

WORKS: AMBRIDGE, PA., CHICAGO, ILL., NEWARK, N. J., PUTNAM, CONN.

Important facts to know about Laminated Plastics

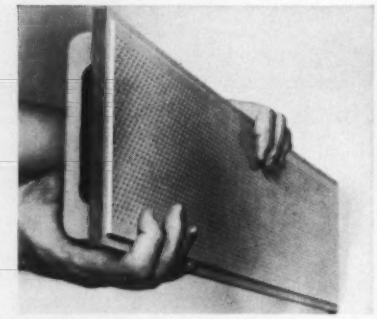
LAMINATED PLASTICS *What they are, where they can be used*

Taylor laminated plastics, also known as reinforced plastics, are thermosetting-type materials formed by impregnating paper, cotton cloth, asbestos, glass cloth, nylon or other base materials with synthetic resins and fusing them into sheets, rods, tubes and special shapes under heat and pressure. These materials exhibit a valuable combination of characteristics, including high electrical insulation resistance, structural strength, strength-to-weight ratio, and resistance to chemical reaction; also adaptability to fabricating operations.

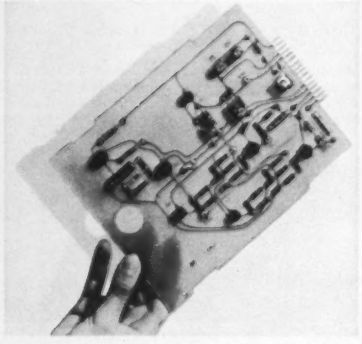
Types of laminated plastics made by Taylor

There are four basic types of Taylor laminated plastics commonly specified and used throughout industry today. They are as follows:

Phenolic Laminates. Paper, cotton fabric or mat, asbestos, glass cloth or nylon bases impregnated with phenol formaldehyde resins. These provide strength and rigidity, dimensional stability, resistance to heat, chemical resistance, and good dielectric characteristics. Some Taylor grades are excellent basic materials for gears, cams, pinions, bearings and other mechanical applications. Others are widely used in terminal boards, switchgear, circuit breakers, switches, electrical appliances and motors. Also in radios, television equipment and other electronic devices; and in missiles as nose cones, exhaust nozzles, and combustion chamber liners.

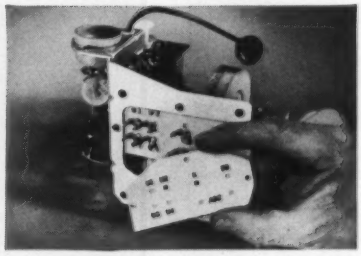


Melamine Laminates. Glass cloth or cotton fabric impregnated with melamine formaldehyde resin. Taylor melamine laminates have superior mechanical strength and are especially desirable for their arc-resistant qualities. Good flame and heat resistance, good resistance to the corrosive effects of alkalis and most other common solvents, besides other favorable characteristics. Typical applications include arc barriers, switchboard panels, and circuit-breaker parts in electrical installations.



Silicone Laminates. Continuous-filament woven glass fabric impregnated with a silicone resin. These laminates combine high heat resistance (up to 500°F. continuous) with excellent electrical and mechanical properties. They are primarily used in high-temperature electrical applications and high-frequency radio equipment.

Epoxy Laminates. Continuous-filament woven glass fabric or paper impregnated with epoxy resin. Glass-fabric grades are designed for use in applications requiring high humidity-resistance, good chemical resistance,



and strength retention at elevated temperatures. Paper grades are used under high-humidity conditions where resistance to acids and alkalis is required. Both grades are characterized by good dielectric strength, low dielectric losses, and high insulation resistance even following severe humidity conditions.

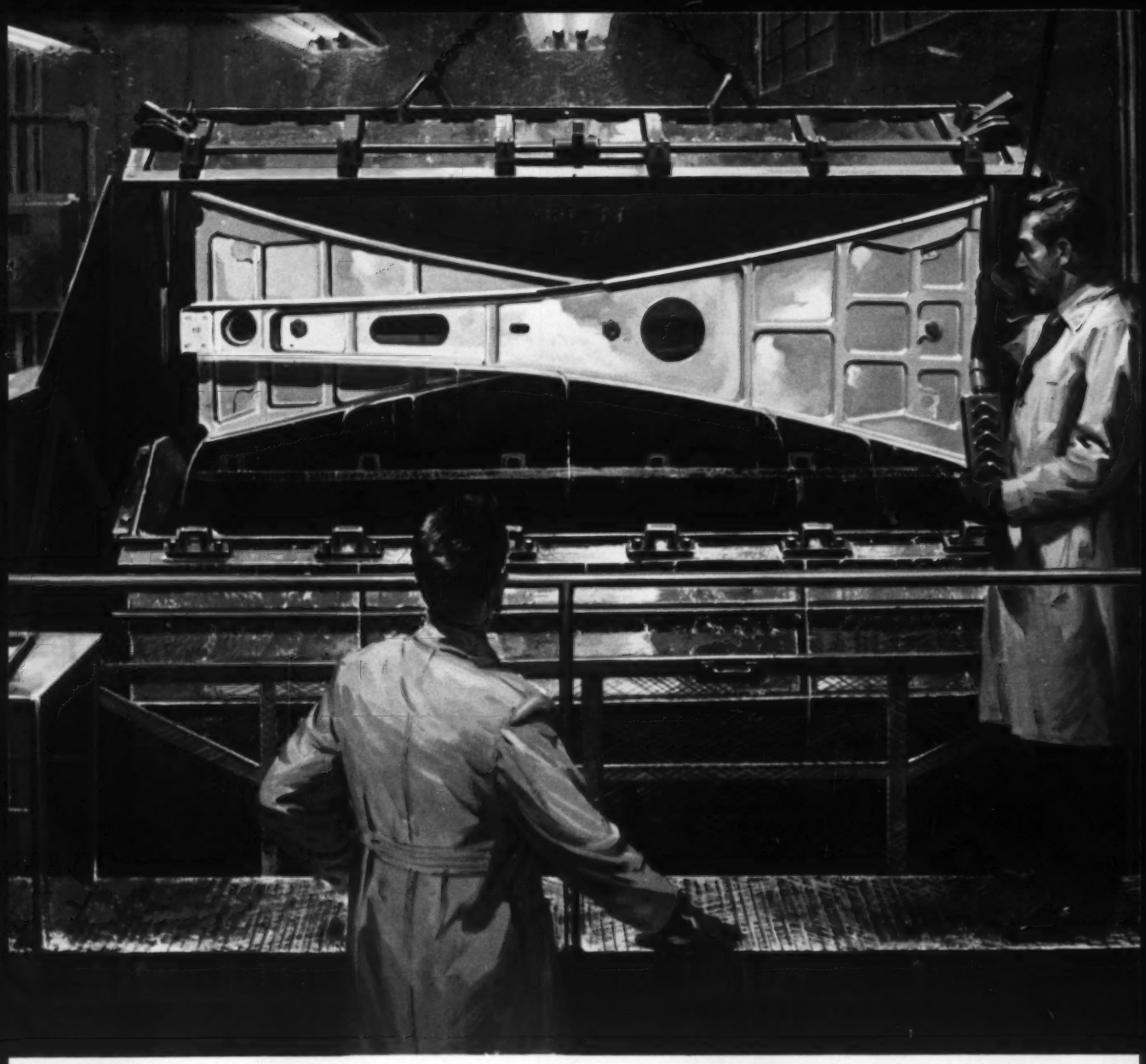
• • •

Recent technical advances in the bonding of various metallic and nonmetallic materials to laminated plastics have opened up new design opportunities. It is now possible to bond virtually any compatible material with a laminated plastic to form a composite which combines the advantages of both. One of the first composite materials was a copper-clad laminate used for printed circuits. More recent composite laminates, usually manufactured to customer specification, include the following: Taylorite® vulcanized fibre-clad, rubber-clad, asbestos-clad, aluminum-clad, beryllium-copper-clad, stainless-steel-clad, magnesium-clad, and silver- and gold-clad. Any one of these materials can be sandwiched between sheets of laminates, too, and can be molded to fit specific requirements.

Send for complete information about any or all of these Taylor laminates. And remember Taylor's new selection guide will simplify your problems in choosing the right laminate for your specific application. Taylor Fibre Co., Norristown 52, Pa.

Taylor

LAMINATED PLASTICS VULCANIZED FIBRE



The "Touch of Gold" applied on a grand scale to barrel finishing

A giant size barrel and Norton TUMBLEX* abrasive reduce the cost of putting the finishing touch on these aircraft spars.

Barrel finishing with Norton TUMBLEX* abrasive is finding more and more applications because it performs this function better, faster, and for less money than other methods.

Norton brings this value-adding, profit-increasing "Touch of Gold" to industry in the widest variety of tumbling operations . . . using six types of TUMBLEX* abrasive, each in a variety of sizes, on parts ranging from tiny needles to these seven foot spars.

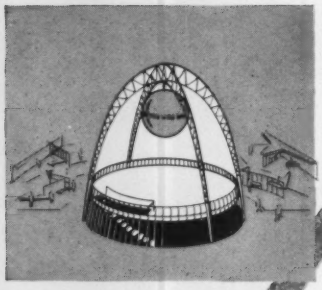
Send in your parts to our Sample Processing Department. We will finish them using the correct abrasive and send you a detailed report on methods and equipment. Send your parts to NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



Theme Tower Symbol of the 1960 Metal Show

Why we plan to be in Philadelphia October 17

"Rarely has a meeting meant so much to me as this one. Needless to say, it is a real privilege to be able to participate in this nationally known event, in the many excellent papers to be given, the opportunities to meet old friends and new, and to further our profession."

V. F. Zackay, Supervisor
Physical Metallurgy Section
Metallurgy Department
Scientific Laboratory
FORD MOTOR COMPANY

"The problem of keeping abreast of new developments in today's rapidly changing technology is always difficult. The Metal Show, through its audio-visual presentations of current advances in knowledge, presents a time-condensed package for those interested in metals engineering and processing."

R. F. Thomson, Head
Metallurgical Engineering Dept.
Research Laboratories
GENERAL MOTORS CORP.

The experts see the value of the 1960 Philadelphia Metal Show — they know how stimulating it will be, and that's why they plan to attend. They know that a new emphasis on the essential metals and materials, processes and techniques will make the 1960 Show more valuable than ever before . . . a truly dynamic forum . . . some 300 exhibits and 250 technical papers. Attendance will be a sound investment for you and your company!

"The opportunity to attend the Metal Show should be particularly rewarding this year with the participation of many outstanding metal organizations. I anticipate making and renewing acquaintances with professional people who share my interest in metallurgical matters. It is also a worthwhile experience to attend the presentation of carefully selected technical papers and to participate in the resulting discussions."

R. D. Chapman,
Asst. Chief Engineer
Basic Sciences Research
CHRYSLER CORPORATION

NATIONAL METAL CONGRESS and EXPOSITION

Philadelphia Trade & Convention Center • October 17-21

Sponsored by the AMERICAN SOCIETY FOR METALS *Metals Park • Novelty, Ohio*

Cooperating Activities: The Metallurgical Society of AIME; Society for Non-destructive Testing, Inc. Associations presenting technical sessions in cooperation with ASM: Metal Powder Industries Federation; Metal Treating Institute; Ultrasonic Manufacturers' Association; Industrial Heating Equipment Association; Special Libraries Association—Metals Division; American Society for Testing Materials—Committee B-9; and extensive research and engineering programs of the American Society for Metals, and ASM Seminars.

"T-1" Steel saves 289 tons of weight in 16 lock gates

This is a story about how the tremendous strength of USS "T-1" Steel was utilized to save 289 tons of weight in the lock gates at the new Greenup, Kentucky and Markland, Indiana locks and dams on the Ohio River. Each lock gate has five diagonal braces that were designed for USS "T-1" Constructional Alloy Steel. At Greenup, it was estimated that 64 tons of "T-1" Steel did the work of 213 tons of carbon steel in eight gates. At Markland, 60 tons of "T-1" Steel were used instead of 200 tons of carbon steel to do the same job.

The diagonal units provide the supports which are absolutely essential to brace the gates. Each diagonal is a flat bar 8 inches wide by 1½ inches thick and about 73 feet long and weighs around 3,200 pounds. Toward the center of the diagonal is a turnbuckle used to adjust tension. By using USS "T-1" Steel, which has a minimum yield strength of 100,000 psi, both the size and weight of the diagonals were greatly reduced while retaining an ample factor of safety.

Lower costs. Reduction in weight because of the use of USS "T-1" Steel meant lower overall material costs, reduced shipping costs by more than one third, and decreased handling and erection costs.

USS "T-1" Steel for hoists. Four hoists for the emergency gates at Greenup locks and dam were also built of USS "T-1" Steel by McNally Pittsburg Mfg. Co., Pittsburg, Kansas. The structures are girder sections about 25 feet long and 41 inches deep. Flanges are 20 inches wide by 2½ inches thick. The webs are 36 inches deep by 1¼ inches thick. All were fabricated from "T-1" Steel plates. Each girder weighs about 12,000 pounds.

The new locks and dam on the Ohio River at Greenup, Kentucky were built under supervision of Huntington, W. Va. District, U. S. Army Corps of Engineers. A similar set of locks at Markland, Indiana was built under the Louisville District, U. S. Army Corps of Engineers. Gates fabricated by Nashville Bridge Company.

Other uses of USS "T-1" Steel in construction. Wherever great strength is needed with least weight, such as in bridges, TV towers, pressure vessels, and high pressure penstocks, USS "T-1" Steel offers many advantages. And for big construction machinery, "T-1" Steel is unsurpassed because of its strength, high resistance to impact abrasion, and weldability. For complete information, write for our "T-1" book. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and "T-1" are registered trademarks

United States Steel Corporation – Pittsburgh
Columbia-Geneva Steel – San Francisco
National Tube – Pittsburgh
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company
United States Steel

This mark tells you a product is made of modern, dependable Steel.

Down go back-up roll costs with

USS Quality Forged Sleeves

PICTURED ABOVE is James S. Rennick, a metallurgist with twenty years' experience in the Forgings Division of U. S. Steel. Jim specifies composition, heat treatment, and other processing procedures essential to the production of assemblies as shown in the main picture—a back-up roll that will be used in the cold reduction tin mill at U. S. Steel's Gary, Indiana plant.

This job points up a curious situation: U. S. Steel is one of the country's leading manufacturers of rolls, and also one of the biggest *users* of rolls . . . a double reason to perfect their performance and reduce their cost . . . just as we did here.

We had to replace a worn, cast steel back-up roll. Rather than replace the entire roll, we machined the face of the roll and shrunk on a *forged* steel sleeve. For back-up rolls like this one, 42″ O.D. and larger, this method of sleeving is much less expensive than buying a complete new roll. One arbor can be used for several forged sleeves. A forged sleeve has a hard, wear-resistant surface and is highly resistant to spalling.

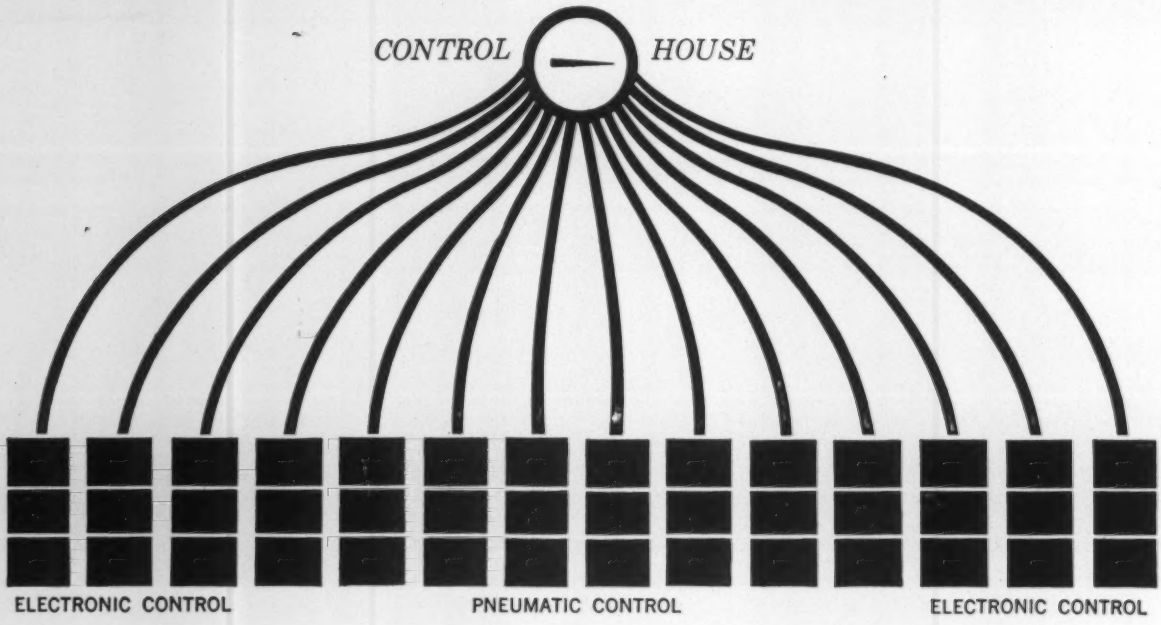
Also, the sleeve is purposely produced with a softer bore to develop a desirable stress pattern, and to provide maximum gripping between the arbor and sleeve after assembly.

There is a good possibility that we can help reduce *your* roll costs. Write or call the United States Steel Office nearest you, or United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

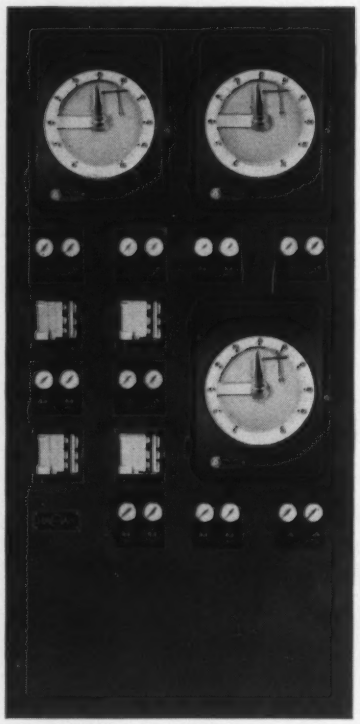


Centralized control puts panels for 42 SOAKING PITS in a single 50-FOOT CONTROL HOUSE

A major steel producer engaged in an expansion program projected the building of 42 new soaking pits, arranged in 14 rows of 3 pits each, *but the space available for a centralized control house was only 50 feet long.* In addition, each panel must provide high visibility of pit temperatures, heaters wanted to be able to see the entire trend of the heat on recorder charts, metallurgists wanted daily access to individual pit temperature and fuel flow records, the instrument department wanted chart changing held to a minimum.

Two recent Hagan developments provided the solution to this problem—one was a new instrument which records both pit temperature and fuel input on a single 24-hour chart, and has a highly readable pit temperature indicator. The other was the use of Hagan PowrMag electronic (magnetic amplifier) control for the 6 rows of pits furthest from the central control house. Row variables—flue pressure, air pressure, combustion air pressure and recuperator temperature—are recorded on standard 30-day miniature strip chart instruments.

With this arrangement, all of the user's requirements were met. Here



Complete control for one 3-hole row of soaking pits is housed in this 3½-foot panel.

are the details on how it works out:

1. Panel width is exactly 3½ feet per 3-hole row, so the panels for all 42 pits total 49 feet. This permits the use of the desired centralized control house, attended by one heater.
2. Only one chart per pit will be changed daily. This can be done when the instrument man date stamps the 30-day charts.
3. The entire record of a heat is visible on the 24-hour chart without need for withdrawing the instrument from its case.
4. The indicating scale showing pit temperature has high visibility—the heater will have no difficulty keeping track of each row.

Hagan electronic and pneumatic controls are designed with the need for centralized control in mind. For assistance with your particular problem, write or phone for a Hagan engineer. For specific information on soaking pit controls, **ask for Bulletin MSA-177.**

HAGAN
CHEMICALS & CONTROLS, INC.
HAGAN CENTER, PITTSBURGH 30, PA.

HAGAN DIVISIONS: CALGON CO.—HALL LABORATORIES—BRUNER CORP.

working with Du Pont Delrin®

one of Du Pont's versatile engineering materials

Air-brake couplings of Du Pont DELRIN® cost less...weigh less

By designing in a new material, Midland-Ross, Owosso, Michigan, produced a better coupling, costing less. To make these rugged couplings, which are used on the air-brake systems of truck trailers, it took a material as durable as new Du Pont DELRIN acetal resin. For example, Midland-Ross's tests require no leakage at 150 psi internal pressure, no creep in the locking ramps under 500-lb. load for 24 hours at 200°F, and operability after 5,000 breakaways. DELRIN easily passed these and other tough tests.

DELRIN is lightweight and corrosion-resistant, its non-sparking qualities offer greater safety. The resilience and stiffness of DELRIN give strength, which allows the couplings to separate under excessive load before air hoses break. Because DELRIN can be readily molded with a ramp-type lock construction, troublesome lock ball jamming and spring breakage are eliminated.

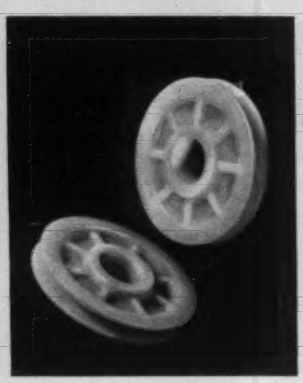
Versatile Du Pont DELRIN has already been put to good use in hundreds of applications, including household items, telephone components, gear housings, plumbing fixtures, valve parts and clothing fitments. On the next page you will find some of the product improvements made possible by the use of Du Pont DELRIN.

DU PONT
REG U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

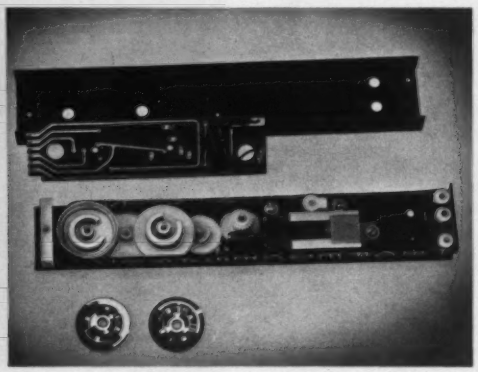
working with Du Pont **Delrin**®

one of Du Pont's versatile engineering materials

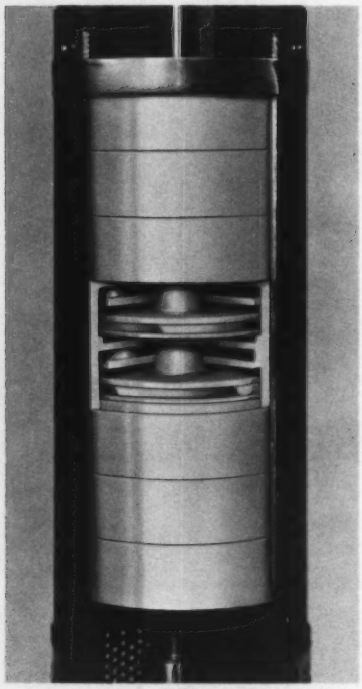
Typical end-uses show how Delrin® is doing so many jobs once reserved for metals



Long-wearing parking-brake cable pulleys of DELRIN are being used by a leading car manufacturer. The full radius groove in DELRIN provides natural mating, maximum contact area with the cable . . . eliminates the cable pinching caused by split-type steel pulleys. Pulleys have been tested under severe long-term conditions of high load and temperatures.



In their Post-Rite® data indicator, the General Railway Signal Co., Rochester, N.Y., uses nine parts of DELRIN, molded by Control Molding Corp. These gears, cams and rollers function as a gear train that guides a printed tape to a view port upon electrical impulse. These indicators must operate without lubrication at high temperatures with minimum maintenance. Only DELRIN could provide the dimensional stability, light weight, low-friction operation required in long-term use.



In an eight-stage submersible pump (two stages shown) precision-molded parts of DELRIN replace brass components . . . making possible improved performance, increased efficiency and a substantial cost saving. The Flint and Walling Mfg. Co., Kendallville, Ind., reports that DELRIN has given superior performance over brass in abrasion resistance and corrosion resistance and the prevention of mineral build-up . . . permits "top pump performance at bottom dollar prices."

Consider the strength, stiffness, dimensional stability, resilience and abrasion resistance of DELRIN acetal resins. These properties are retained even under exposure to wide variations in temperature, humidity, solvents and stress. Already hundreds of designs taking advantage of these properties and of the cost savings made possible by rapid injection molding have been specified or put into commercial production. We suggest that you investigate how DELRIN can be profitably used in the products you make and the products you use. Commercial processors and our own staff of technologists are ready to assist you.

POLYCHEMICALS DEPARTMENT

DU PONT
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BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.), Dept. A-1 3 4 5 6 7
Room 2507D Nemours Building, Wilmington 98, Delaware
I am interested in evaluating DELRIN for the following use:

_____

*Name*_____

*Company*_____ *Position*_____

*Street*_____

*City*_____ *Zone*____ *State*_____

In Canada: Du Pont of Canada Limited, P. O. Box 660, Montreal, Quebec.

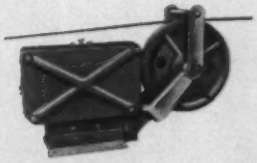
DELRIN® *acetal resins*

one of Du Pont's versatile engineering materials

Alathon® · **Zytel**® · **Lucite**®

UNIT-COLES
UNIT-COLES
UNIT-COLES
UNIT-COLES

■ *the world's* ■
■ *safest crane* ■



YOU CAN'T OVERLOAD THIS CRANE!
This Automatic Safe Load Controller weighs each load — visually and audibly warns operator attempting unsafe lift — automatically stops and holds hoist motions if warnings are ignored.

CLOSE-QUARTER WORKABILITY *WITH* *INDEPENDENT ELECTRIC POWERING OF* **ALL** *MOTIONS FOR* SWIFT, SAFE PICK-N-CARRY HANDLING

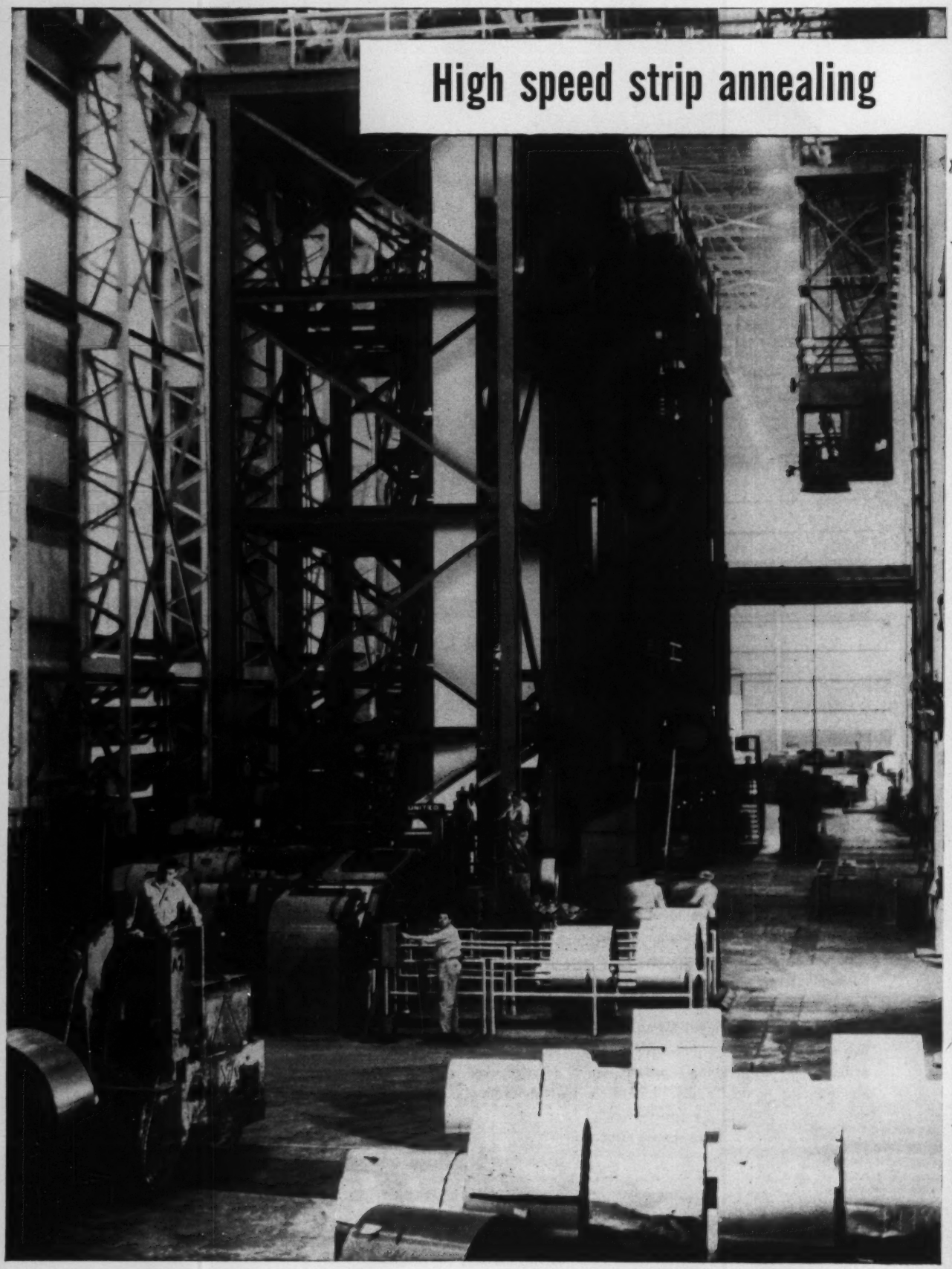
■ *This Midwestern metal fabricating firm has the problem of moving heavy, cumbersome sections from its structural and fabricated steel department to out-of-door storage areas. Chosen for the job is this self-propelled UNIT-COLES mobile crane — the only rig offering so many outstanding advantages essential to swift, safe pick-n-carry handling.*

UNIT-COLES' cantilever-type boom, with its low overall height, makes this crane ideal for in-plant pickups and for moves through low clearance doorways. Tail swing and turning radius are shortest of any American-made full-circle revolving crane, enabling a **UNIT-COLES** to travel and swing a full 360° in a narrow 12-ft. aisle. Electrically-driven independent swing and travel plus instinctive steering control — "left-for-left" and "right-for-right" with cab in any position — provide unlimited maneuverability in the tightest spots. Load-hoist and boom-hoist are actuated by fast, smooth, positive electric power . . . can be operated simultaneously or individually while the crane is in motion. Automatic braking on all crane motions plus automatic protection against over-travel of boom and block constantly protect men, machine and load. There's so much more you should know about a **UNIT-COLES**. Why not call your dealer soon for an analysis of your handling requirements? In the broad line of **UNIT-COLES** cranes — capacities range from 5 to 55 tons — there's the exact size machine to match your needs.

UNIT

UNIT CRANE & SHOVEL CORP.
6705 W. Burnham Street
Milwaukee 19, Wisconsin

High speed strip annealing



gives steel makers major cost and product benefits

Evolution of process gets major assist from Reliance's creative engineering

Speeds up to 2,000 feet per minute, thinner gauge steel, greater annealing uniformity, and higher tonnage output are the chief reasons for the spread of this process. Actually, lines like this one at Kaiser Steel can handle gauges from .0150" down to .0070" in coils up to 90" outside diameter and widths of 42" or greater . . . reducing costs in a growing tinplate industry.

Associated electrical equipment must be upgraded to meet the call for higher yield annealing lines. Reliance engineering is presently meeting that challenge. Here are some of the ways:

Furnace tension control

On advanced Reliance systems, the exit bridle is the lead and overall furnace tension is maintained by the entry bridle. Maximum line flexibility is provided, since the entry bridle can be position-controlled or tension-controlled. In tension-control, a regulator monitors the bridle torque, maintaining it at the pre-set level.

For position-control, a torque-regulated furnace tension unit position-controls the entry bridle. The tension unit consists of a short loop provided by a loaded roll, the position of which modifies the speed of the entry bridle. The roll may be locked in position when the bridle is directly controlling strip tension.

Helper drive torque regulation

Since it is economically unfeasible to regulate each of many furnace helper motors, the helpers have been grouped by furnace function (heat section, hold section, slow cool and fast cool). Each group is torque-regulated and each motor held within a group can be adjusted manually to take its share of the load while the entire section automatically holds its relative load position with respect to other sections. Reliance has encouraged the use of this system.

Reliance also strongly recommends the equipment explained below:

Strip-tension measuring load cells

These measure the strip tension existing at the exit end of each furnace section. Associated recording meters enable the operators to relate strip quality and elongation to helper drive torque settings of each section for different conditions of speed, gauge, etc.; in other words, able to study various settings of torque—and be able to repeat those which give the best results.

Automatic furnace tension control

The load cells provide an output signal which *can* be used as an input to the section torque regulators to maintain continuously desired tension. Correct inertia compensation for line speed changes is inherently provided by this system.

Synchro-control of looping tower

This eliminates inaccessible or hard-to-service photo-electric elements. A synchro is used to indicate and regulate tower position.

Automated strip feed-up

This increases the efficiency of entry end material handling, allowing high furnace speeds to be maintained.

It will pay you to discuss with Reliance engineers some of the fine points of annealing line system controls and drives. Creative application engineering, plus the ability to assume total responsibility through start-up and service are the reasons why Reliance is so readily acceptable at engineering, production and management levels of industry. Call your Reliance Sales Engineer. He has an office near you. If you prefer, write for Bulletin L-2513.

L-1672-RW

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

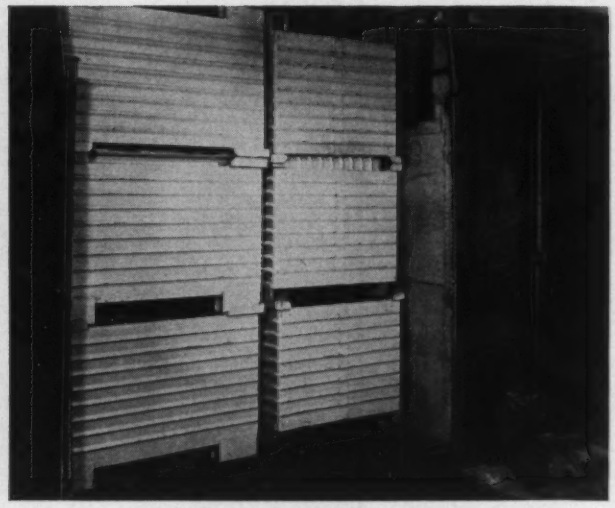
RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 28A, CLEVELAND 17, OHIO
Canadian Division: Toronto, Ontario
Sales Offices and Distributors in Principal Cities

Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.

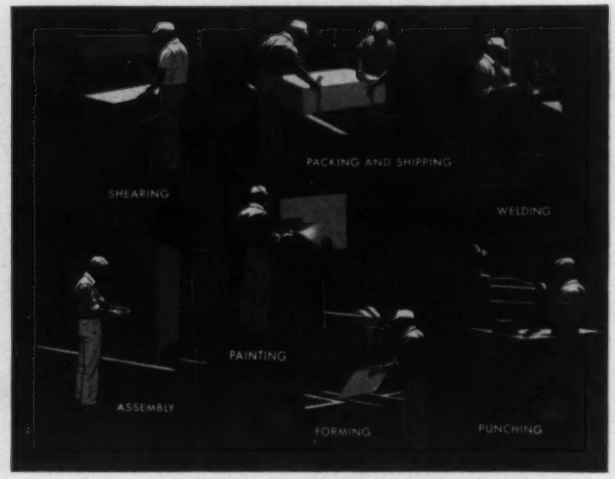
Whirlpool CORPORATION...

The Republic Roll-Over boxes have channel shaped legs which enable narrow forks to enter the legs, lift the unit, roll it over to hopperize the load, and then return the unit to a normal upright position. The boxes also have 8-way fork entry which facilitates narrow aisle handling.



The unique design of these special Republic Roll-Over Boxes permits nesting four high in trailers for inter-plant shipment. Special stacking brackets hold each Unit in place, eliminate sliding from side-to-side, or front-to-back, for greater safety in shipping and storing, and permit stacking eight high safely in storage areas. The results are savings in storage space, production time, and handling costs.

REPUBLIC STEEL LOCKERS give change, wash, and dress centers a new look, protect employee valuables and tools. Available with popular locking devices. Handles attached with tamper-free Gulmite screws and lockwashers. Bonderizing protects against rust and corrosion, reduces maintenance costs. Republic will help you with locker planning, and assume full responsibility for installation. Write today.



REPUBLIC CAN DO IT FOR YOU—complete facilities for fabricating steel sheets, stainless steel sheets, vinyl coated steel sheets. Republic engineers work with you in developing your product, in solving manufacturing, assembly, and delivery problems. Well rounded stock of tools, dies, and a complete machine shop. Modern production line for shearing, punching, forming, painting, assembly. Call your Republic representative or write.

leading appliance manufacturer moves materials faster, easier, safer...with

REPUBLIC ROLL-OVER BOXES

Republic Roll-Over Boxes are used in moving materials to assembly lines in keeping production humming at Whirlpool Corporation, St. Joseph, Michigan.

These Units were designed and engineered by Andy Thomas of the Whirlpool Corporation, in conjunction with Republic material handling specialists, and Carl Thorkelson of Thornel Associates, containerization specialists representing Republic with offices at Chicago, Illinois.

This is a typical example of how Republic material handling specialists and representatives work with industries, big and small, in recommending proper Republic Units to save production time and costs.

Call your Republic representative or write direct for this expert service. Use the convenient coupon below.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC METAL LUMBER is a versatile building product of 1000 and 1 uses. Faster, safer, stronger framing in any application where common building products are now used. Simply measure, cut, assemble. Engineered slotted angle pattern speeds erection, reduces time and material costs. Solves hard to stock storage problems. Bonderized. Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Send for attractive brochure.

The Whirlpool Corporation, a leading manufacturer of appliances for the home, has ordered 3000 of these special Republic Roll-Over Boxes. Republic material handling specialists will work with you in recommending standard units or in designing special units to move materials faster, easier, safer. Call your Republic representative, or write direct.

REPUBLIC STEEL CORPORATION
DEPT. IA-9935
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following products:

- ☐ Republic Material Handling Units
- ☐ Roll-Over Boxes
- ☐ Republic Steel Lockers
- ☐ Republic METAL LUMBER®
- ☐ Republic Berger Division Sheet Steel Fabrication Facilities
- ☐ Please have a Republic representative call

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

COST CHECK
5-4-5

3M'S "COST CHECK 5-4-5" PROGRAM CAN HELP YOU DISCOVER:

- ✔ IF YOUR GRINDING CAN BE DONE MORE ECONOMICALLY
- ✔ IF YOUR FINISHING IS AS EFFICIENT AS POSSIBLE
- ✔ IF YOUR POLISHING CAN BE DONE FASTER AND BETTER

3M Announces....

COST CHECK 5-4-5

a cost analysis program for grinding, finishing, polishing

3M's new "Cost Check 5-4-5" program can help point the way to lower costs and higher profits for you. And it's easy to do with the Cost Check review form we provide for your use.

All you do is jot down the facts requested on the simple job description page, and you're ready for a review and brief discussion with your local 3M Representative.

Here's the expert assistance 3M's "COST CHECK 5-4-5" offers you:

* 3M's background of 58 years of experience in producing new and better coated abrasives for every phase of industry.

* 3M's technical knowledge of advanced methods, based on creative research in new applications of coated abrasives for every type of industrial job.

* 3M's research programs that provide the latest products and applications that are available anywhere—to help you cut costs, improve profits.

* 3M's trained representative who can call upon this vast array of experience and talent to answer your questions and give you on-the-spot recommendations.

Take Advantage of 3M's new "Cost Check 5-4-5" service without obligation. Fill out and mail in the coupon and your Cost Check kit will be sent to you promptly.

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3M COMPANY, Dept. AAS-80,
900 Bush Ave., St. Paul 6, Minn.

Send me my "COST CHECK 5-4-5" Kit.

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ADDRESS_____

CITY_____ STATE_____

NO. 6 OF A SERIES

"How to Design Welded Aluminum Structures"

Choice of Proper Filler Alloy Can Increase Strength of Welded Aluminum 40%

Mr. Harry N. Hill, *Engineering Design Division Chief, Alcoa Research Laboratories, Aluminum Company of America, reports research findings presented at the 1959 annual meeting of the American Society of Civil Engineers.*

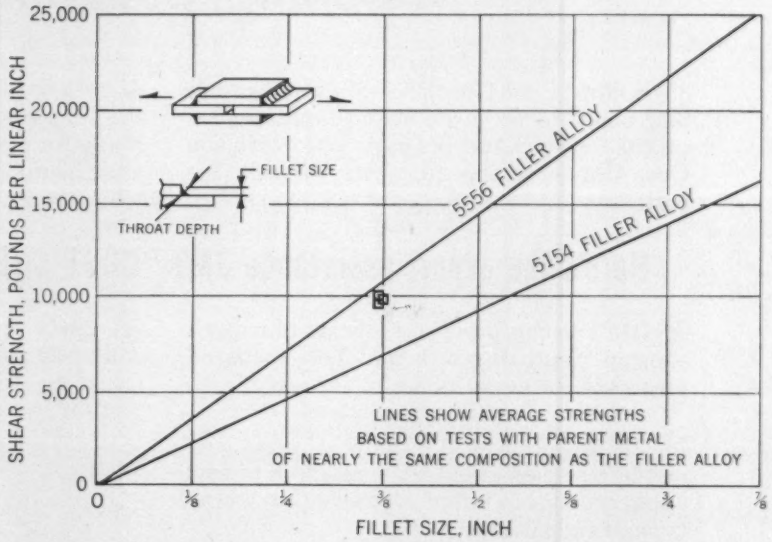
Use of a filler alloy nominally the same composition as the parent metal is common practice in joining aluminum alloys. Investigation at the Alcoa Research Laboratories, however, reveals that this widely accepted technique rather seriously penalizes the strength of welded joints!

Strength is most frequently the controlling factor in selecting a particular filler alloy. For *maximum* strength, apply the following general rule: *Where possible, use a filler alloy that will be stronger in the weld than the parent metal adjacent to the weld.* An investigation of fillet-weld strength reveals why.

A fillet weld transmits load by shear . . . particularly longitudinal fillet welds, where the shearing force is along the length of the weld.

Minimum shear area occurs at the throat depth. Since shear area at the sides of the fillet is about 40 per cent greater than at the throat area, a longitudinal fillet weld will fail in shear at the throat section unless the weld is stronger than the adjacent metal by about 40 per cent or more. Use of a higher strength filler alloy can therefore increase the strength of a longitudinal fillet weld by about 40 per cent.

In a transverse fillet weld, the complex stress state makes a simple analysis impossible. The accompanying chart demonstrates the increased strength actually realized with the use of higher strength filler alloy in transverse fillet welds. Fillet welds in alloy 5154 were *35 per cent stronger* when made with filler alloy 5556 than when made with filler alloy of the same composition as that of the parent metal.



SHEAR STRENGTH OF TRANSVERSE FILLET WELDS OF 5154 PLATE—USING 5556 FILLER

The increased strength of fillet welds thus obtained permits use of less weld for a given load with consequent savings in both material and welding costs.

Although the advantages of higher strength filler alloy are greatest in fillet welds, tests indicate some improvement with welded *butt joints.*

In selecting the best combination of parent and filler alloys, the designer must consider such matters as ease of welding, corrosion resistance, operating temperature, ductility, and sometimes color . . . in addition to strength. Alcoa has prepared a handy filler metal selection chart to help you, which is available free on request.

The next article in this series will present basic design data for the most important of the weldable aluminum alloys. A final article dealing with the fatigue strength of welded aluminum alloys will conclude the series.

For top-quality aluminum welding products such as consumable electrodes, welding and brazing rods and fluxes, and solder and soldering fluxes, contact your nearest Alcoa sales office. For more complete information on "Designing Welded Aluminum Structures," write Aluminum Company of America, 1761-H Alcoa Building, Pittsburgh 19, Pennsylvania.

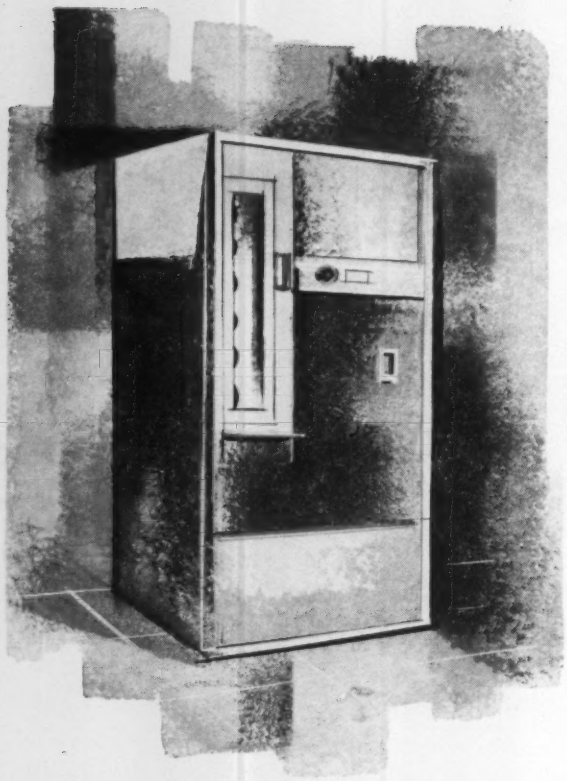
ALCOA ALUMINUM

WELDING MATERIALS

BLAW-KNOX

Blaw-Knox designs and builds all types of cold reduction and temper mills for ferrous and non-ferrous work. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, Pittsburgh 22, Pa.

60-inch, 4-stand tandem cold reduction mill and temper mill



New steels are born at Armco

from vending to mending . . .

Sheffield has the right bolts

Making things or repairing things, there's a Sheffield bolt for every purpose. Manufacturers of vending machines use Sheffield bolts. So do makers of thousands of other products. So do farmers and do-it-yourselfers.

Sheffield bolts are a vital part of railroads. They travel the highways in cars and trucks. They fasten machinery and rigs in the oilfields, and ride the air-lanes in jet aircraft. They go down to the sea in ships, and are on the job at home in appliances and power mowers.

Wherever the need is for steel bolts, Sheffield delivers the right bolt, right when it's needed. That takes a lot of skill and productive capacity. That's what you get from one of the world's largest bolt plants, where bolts are made and quality-controlled by Sheffield, from furnace to finished product.

You name the need. Sheffield has the bolt. Standard, special, or custom-made to specifications. Get in touch with your Sheffield Man.

SHEFFIELD
ARMCO

BOLT PRODUCTS

SHEFFIELD DIVISION

Sheffield Plants in Kansas City, Tulsa and Houston

ARMCO

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

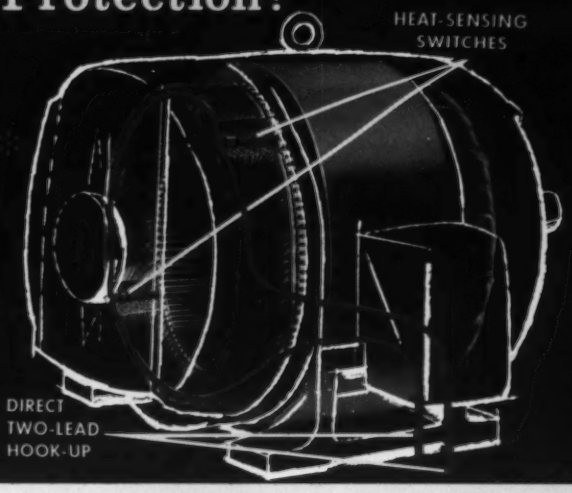
GENERAL ELECTRIC

New Concept in Motor Protection!

Tri-Clad '55'

Thermo-Tector

SYSTEM ENDS OVERLOAD BURNOUT!



General Electric offers a *totally new* type of protection on *all* Tri-Clad '55' motors 7½-125 hp!

Exclusive **THERMO-TECTOR** system has heat-sensing switches buried in stator windings. Switches shut off motor *only* when stalls, overloads or other conditions threaten heat damage to motor windings.

Unique **THERMO-TECTOR** system "anticipation" feature varies motor shut-off point according to rate of winding heat rise. This flexibility allows *maximum motor output* under all conditions.

TURN PAGE FOR FURTHER INFORMATION

ANACONDA ANNEALS FOIL WITH LOW-COST UNIFORMITY

in Power Convection Furnaces

Phenomenal temperature uniformity (never varying more than 5°) and low costs are the profits earned by Anaconda Aluminum with four of these Surface Power Convection furnaces in their Louisville plant.

Each furnace anneals an 8,000-lb. load of coiled aluminum foil in a seven-hour heating cycle. Coils are stacked on racks, as you see here, and fork-lifted directly into the furnaces. Surface DX® generator gas protects the foil during the cycle.

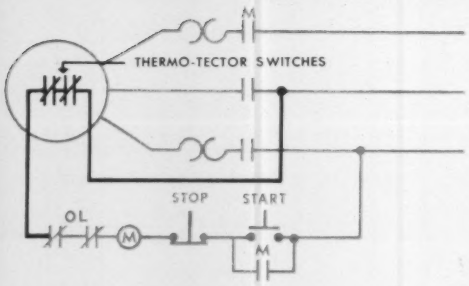
Power Convection* equipment simplifies furnace construction,—just one fan, minimum furnace size for its capacity. This reduces both first cost and operating maintenance. For more data on Surface Power Convection equipment write for Bulletin SC-182. Surface Combustion, 2373 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces Ltd., Toronto, Ontario.

*Trademark of Surface Combustion, Division of Midland-Ross Corp.

Surface *A division of Midland-Ross Corporation* MR

NEW Tri-Clad® '55' THERMO-TECTOR SYSTEM

Allows Full Motor Output— No Wasteful "Safety Margin" Needed



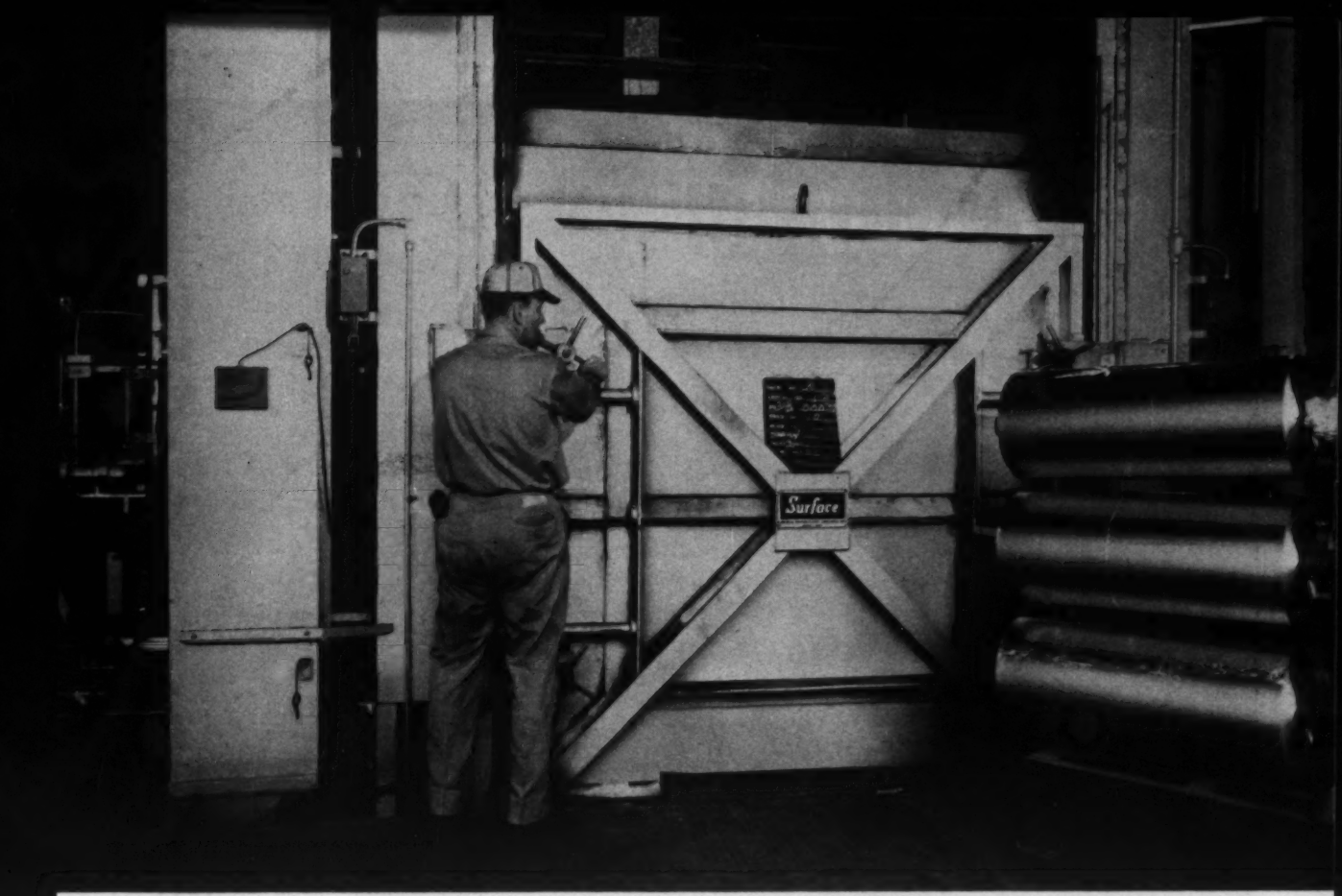
Thermo-Tector system needs *no costly amplifying relays*, connects directly to any G-E motor controller.

You get full output from Tri-Clad '55' motors with Thermo-Tector system. Variable response feature of heat-sensing switches allows motor to operate right up to safe limits under any operating condition.

Thermo-Tector switches are offered on *all* Tri-Clad '55' motors in frames 254U-445U. For more information, contact your G-E Apparatus Sales Office or write for Bulletin GEA-7092, Section 866-03, Schenectady 5, N. Y.

SMALL AC MOTOR & GENERATOR DEPARTMENT

GENERAL ELECTRIC



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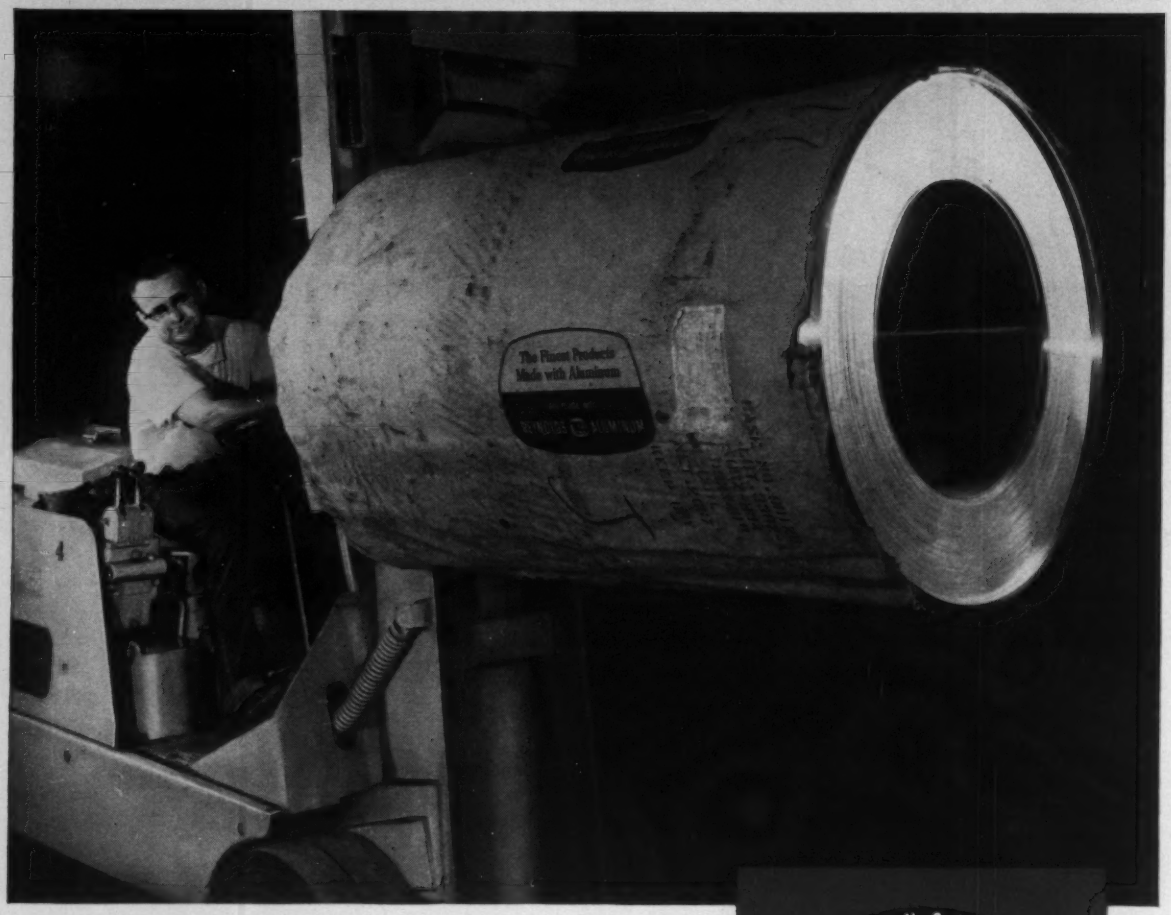
*Trademark of Surface Combustion, Division of Midland-Ross Corp.

Surface *A division of Midland-Ross Corporation* MR

aluminum coiled sheet

...or practically any aluminum mill product



in stock for fast delivery

from the Reynolds Distributor

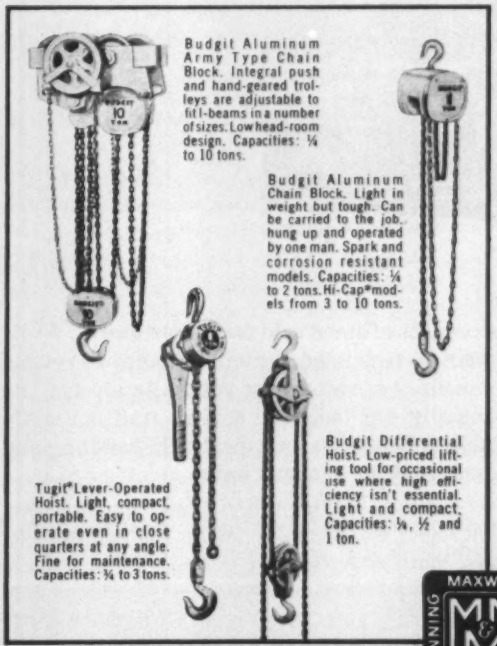
Here's a way to add production capacity *without* enlarging your plant: Convert your warehouse space into working space by depending on your Reynolds Distributor for your aluminum mill products. He stocks the alloys, sizes, shapes and amounts of Reynolds Aluminum you need—and he can get it to you *fast*. Often he can help you with technical assistance and literature. Depend on your Reynolds Distributor for the aluminum, the service, and the know-how you need. *Reynolds Metals Company, P.O. Box 2346-DH, Richmond 18, Virginia.*

REYNOLDS ALUMINUM

Watch Reynolds TV Shows: "Bourbon Street Beat" and "Adventures in Paradise"; and, resuming in October, "All Star Golf"—ABC-TV

For the name of the nearest Reynolds Distributor, look under "Aluminum" in your classified phone book

"BACKBREAKERS" wiped out by Budgit® Chain Blocks



Budgit Aluminum Army Type Chain Block. Integral push and hand-geared trolleys are adjustable to fit I-beams in a number of sizes. Low head-room design. Capacities: ¼ to 10 tons.

Budgit Aluminum Chain Block. Light in weight but tough. Can be carried to the job, hung up and operated by one man. Spark and corrosion resistant models. Capacities: ¼ to 2 tons. Hi-Cap® models from 3 to 10 tons.

Budgit Differential Hoist. Low-priced lifting tool for occasional use where high efficiency isn't essential. Light and compact. Capacities: ¼, ½ and 1 ton.

Tugit® Lever-Operated Hoist. Light, compact, portable. Easy to operate even in close quarters at any angle. Fine for maintenance. Capacities: ¾ to 3 tons.

Eliminate tough lifting and plant maintenance ceases to be a costly muscle-aching job. A large midwestern heavy machinery manufacturer found this only too true. So now Budgit Aluminum Chain Blocks in various capacities are proving to be the perfect answer to countless lifting problems.

These lightweight hoists are easy to get to the job — easy to rig and operate at any angle. These features alone have won wide favor among the maintenance men. For instance, troublesome occasional jobs — repairing furnaces, dismantling machinery, handling large pipe, motors or valves — demand shifting as well as lifting.

Budgit Chain Blocks are also solving handling problems at numerous metalworking machines. Here the number of lifts per day are few but accurate "spotting" of heavy loads is now being done without backbreaking hand chain pull.

Backsaving Budgit Chain Blocks can cut your maintenance costs and also boost your production efficiency. Ask your nearby Shaw-Box Distributors to help you select the types and capacities best suited to your needs. Or write for Bulletin 15025-1C.

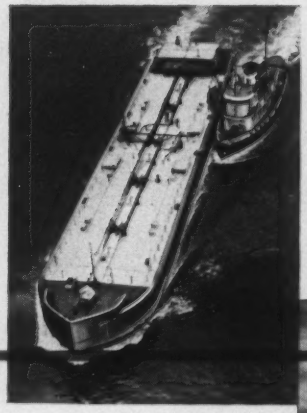
*REGISTERED TRADENAMES

60 C-1

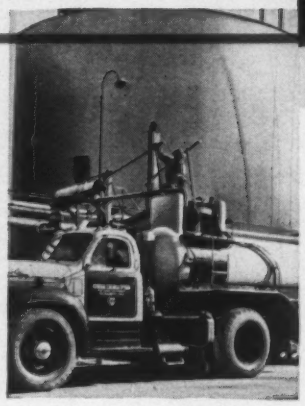
MAXWELL MANNING & MOORE INC. TRADE MARK

BUDGIT CHAIN BLOCKS
A product of
MANNING, MAXWELL & MOORE, INC.
Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

To recover spent sulfuric, call on the leader in sulfuric



GENERAL CHEMICAL



Of General Chemical's 21 sulfuric plants, 15 are equipped to handle spent sulfuric! Here are their locations:

Anacortes, Washington
Barnet, British Columbia*
Baton Rouge, Louisiana
Buffalo, New York
Denver, Colorado
East St. Louis, Illinois
Elizabeth, New Jersey
El Segundo (Los Angeles), California
Hegewisch (Chicago), Illinois
Newell, Pennsylvania
North Claymont, Delaware
Port Chicago (San Francisco), California
Richmond (San Francisco), California
River Rouge, Michigan
Valleyfield, Quebec*

*In Canada: Allied Chemical Canada, Ltd.

If you are seeking to recover spent sulfuric acid from your operations and your plant is in the vicinity of any of those listed above, it may pay you to talk to General Chemical.

As the nation's leading sulfuric producer, General has years of experience in recovering many types and strengths of spent acid for its customers. While all cannot be reclaimed, we will be happy to review the economics of recovering yours. As always, the assistance of our technical service staff is readily available to help solve any spent acid handling and disposal problems you may have.

Basic to America's Progress

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

FOR SHEER, SHEAR STRENGTH

Hydraulic Pressure tests on Bridgeport Brass Company's patented cladding system show perfect no-leak bonds over 3000 psi.

...Bridgeport Brass Uses EASY-FLO 45 to Bond Their Clad Metals

The "thick and thin" of cladding—from .010 to 2¾" in a combination of ferrous and non ferrous metals—calls for a bonding agent that will hold under the most severe forming and service operations. The answer, in every respect, is Handy and Harman's silver brazing alloy, EASY-FLO 45.

The uses to which these clad metals are put range from the kitchen to power plants, refineries, chemical and food-processing installations. Famous Bridgeport Copperware, used by housewives throughout the country, is made from a triple-clad metal consisting of a sandwich of two sheets of .010 stainless steel bonded to both sides of a sheet of .025 copper. The metals are joined in Bridgeport's patented process at *finish gauge*. So strong is the bond that no difficulty is encountered in the forming operations which follow.

Tube sheets, though their uses are far from "domestic," require the same "bondability." Tests at Bridgeport show that shear strength exceeds 20,000 psi. And this involves the cladding of carbon steel to as many different metals as stainless, brass, Monel and copper.

The primary need here, of course, is strength. EASY-FLO 45 has other attributes that are more than welcome under *any* metals-joining conditions: thermal and electrical conductivity, gas- and liquid-tightness, ductility, ease of application and economy are some more that we'd like you to know more about. We are ready indeed to further acquaint you with the significant benefits of silver alloy brazing by sending you our Bulletin 20, which is a clear and comprehensive introduction to one of the simplest, *saving* metals-joining methods in existence. Handy & Harman, 82 Fulton Street, New York City 38.

Your No. 1 Source of Supply and Authority on Brazing Alloys

HANDY & HARMAN

General Offices: 82 Fulton Street, New York 38, New York

Steel is low in cost. You can keep it that way if you don't tack on unnecessary expense. After you've figured initial price don't overlook what it costs to own, store, handle and cut steel for your use. These costs of possession often are hidden. But your steel service center frequently can help you reduce them.

Each steel user's case is different. Ask your steel service center to help you determine the most economical way to buy steel. They will help you figure all your costs of possession, such as:

Cost of capital	Cost of operation	Other costs
Inventory	Space	Obsolescence
Space	Material handling	Insurance
Equipment	Cutting & burning	Taxes
	Scrap & wastage	Accounting

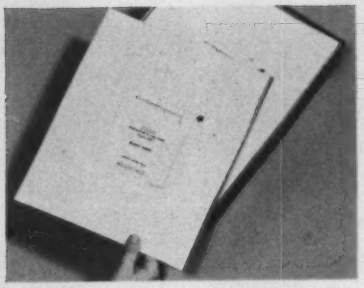
Call your nearby steel service center, or write for free booklet, "What's Your Real Cost of Possession for Steel?"

STEEL SERVICE CENTER INSTITUTE

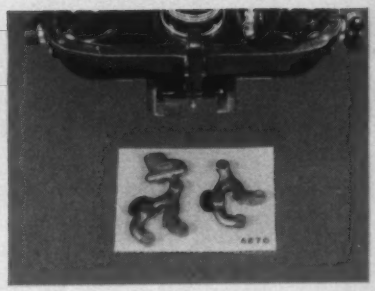
. . . YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE
540-A Terminal Tower, Cleveland 13, Ohio

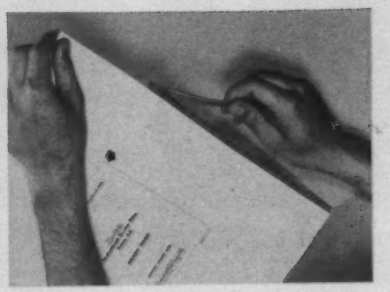
Steel



1) No darkroom loading. Ready for exposure as it comes from the box.



2) Just place in position and expose —the film is protected from dust, dirt, light and moisture.



3) In the darkroom, pull the rip strip, remove film, and process.

...NEW!... READY PACK ....

Kodak Industrial X-ray Film

- Sealed tight until processed—keeps clean
- Very convenient to handle—saves time
- Readily available in Type AA and Type M

Here's new convenience when you are inspecting aluminum or magnesium alloys, thin steels, plastic or anything where lead screens are not required.

Kodak Industrial X-ray Film, Type AA and Type M-Ready Pack comes to you with each sheet sealed in a light-tight envelope ready for exposure. A convenient rip strip makes it easy to open in the darkroom.

These films come 75 to a box in sizes 8 x 10, 10 x 12, 11 x 14, 14 x 17. Order them from your Kodak X-ray dealer.

EASTMAN KODAK COMPANY
X-ray Division • Rochester 4, N. Y.

Kodak
TRADE MARK

Somewhere North of Baffin Bay

The Arctic is almost as silent and lifeless as an ice-cube. But, deep inside it, these 400-foot long missile-detection antennas will guard the life of our country.

They're part of a Ballistic Missile Early Warning System (BMEWS). Officially, you'd call them surveillance radar antennas. Yet, they look like over-sized baseball mitts. That web-like framework can detect (or spot) a far-off missile darting through the shivering Arctic sky, and rifle its speed and direction to any of our military bases in seconds.

Up here, weather is a constant battle. Arctic storms slam into the 163-foot high antennas, and rake icy fingers back and forth over the mesh-faced structures. But they'll stand for years. The D. S. Kennedy Com-

pany, builders, made certain of that by weaving foot after foot of USS National Seamless Carbon and Nickel Alloy Tubing into every antenna.

For over 90 years, USS National Pipe and Tubes have been used for demanding tubular installations in the fields of line pipe, pressure tubing, mechanical tubing, structural pipe and oil country tubular products. Would you like to benefit from our experience? Write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and National are registered trademarks

This mark tells you a product is made of modern, dependable Steel.

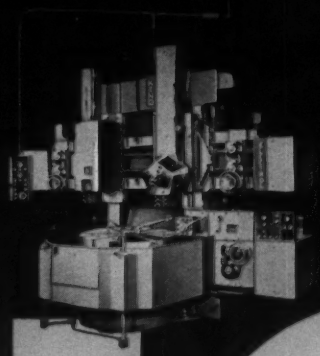
National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

When you talk about the

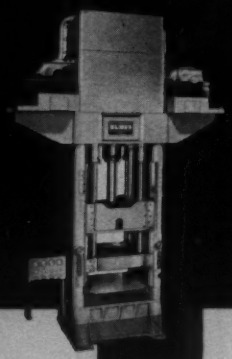
***BETTER* MACHINE TOOLS**

you'll talk about



KING

VERTICAL BORING AND TURNING MACHINES



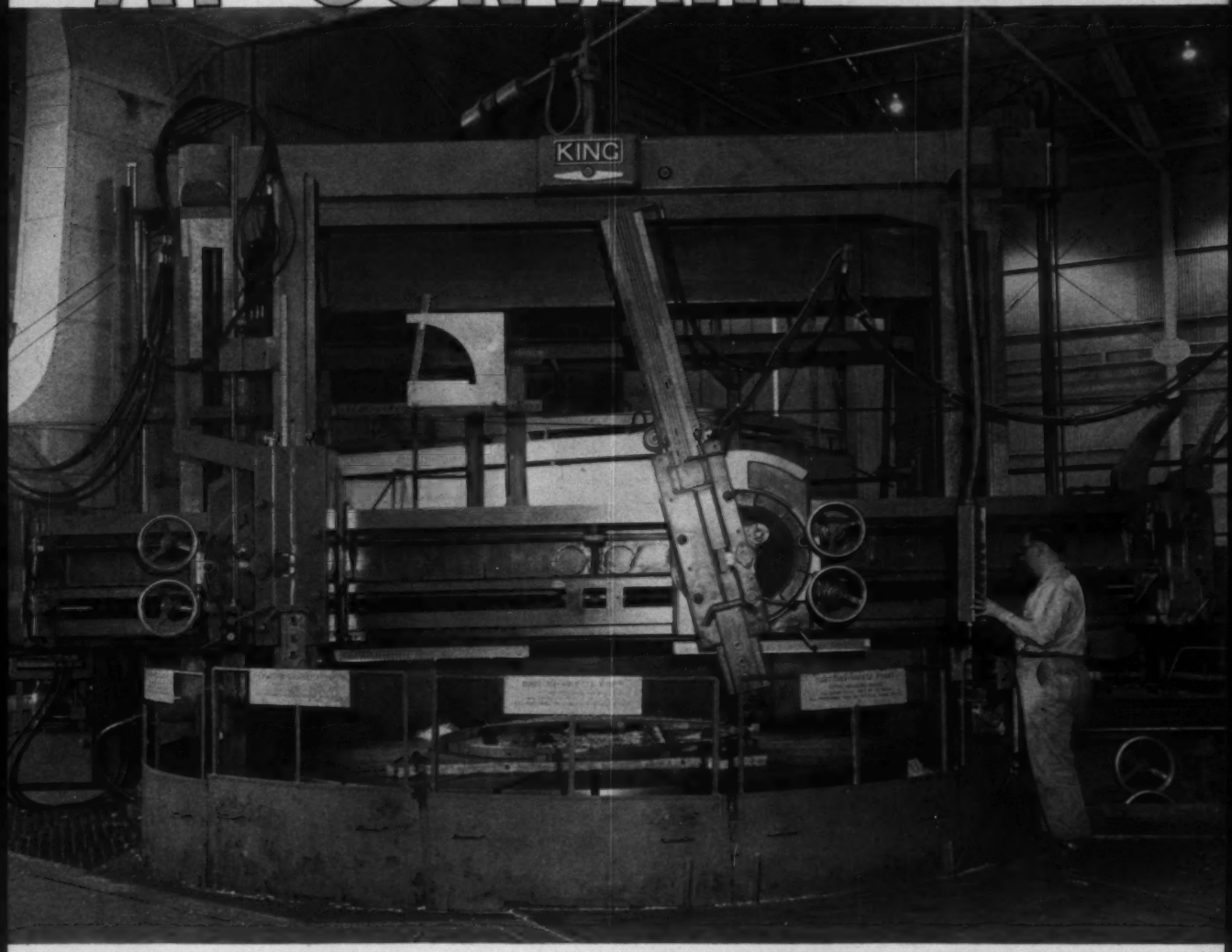
ELMES

HYDRAULIC PRESSES AND EQUIPMENT

for Metalworking, Plastics Molding, Custom-designed Applications.

American Steel Foundries **ELMES/KING DIVISION,** Cincinnati 29, Ohio

AT CONVAIR — SAN DIEGO



Convair's Plant No. 1 Tooling Department uses this specially designed 168" KING® to shape drop hammer dies, plastic patterns used for production mock-ups, and plastic tools. They report, "Production of such tooling in sizes and tolerances required was not possible with previously available machines."

Versatility is just *one* virtue of this big "customized" KING

It's Fast, Accurate and Dependable, too!

KING Vertical Boring and Turning Machines

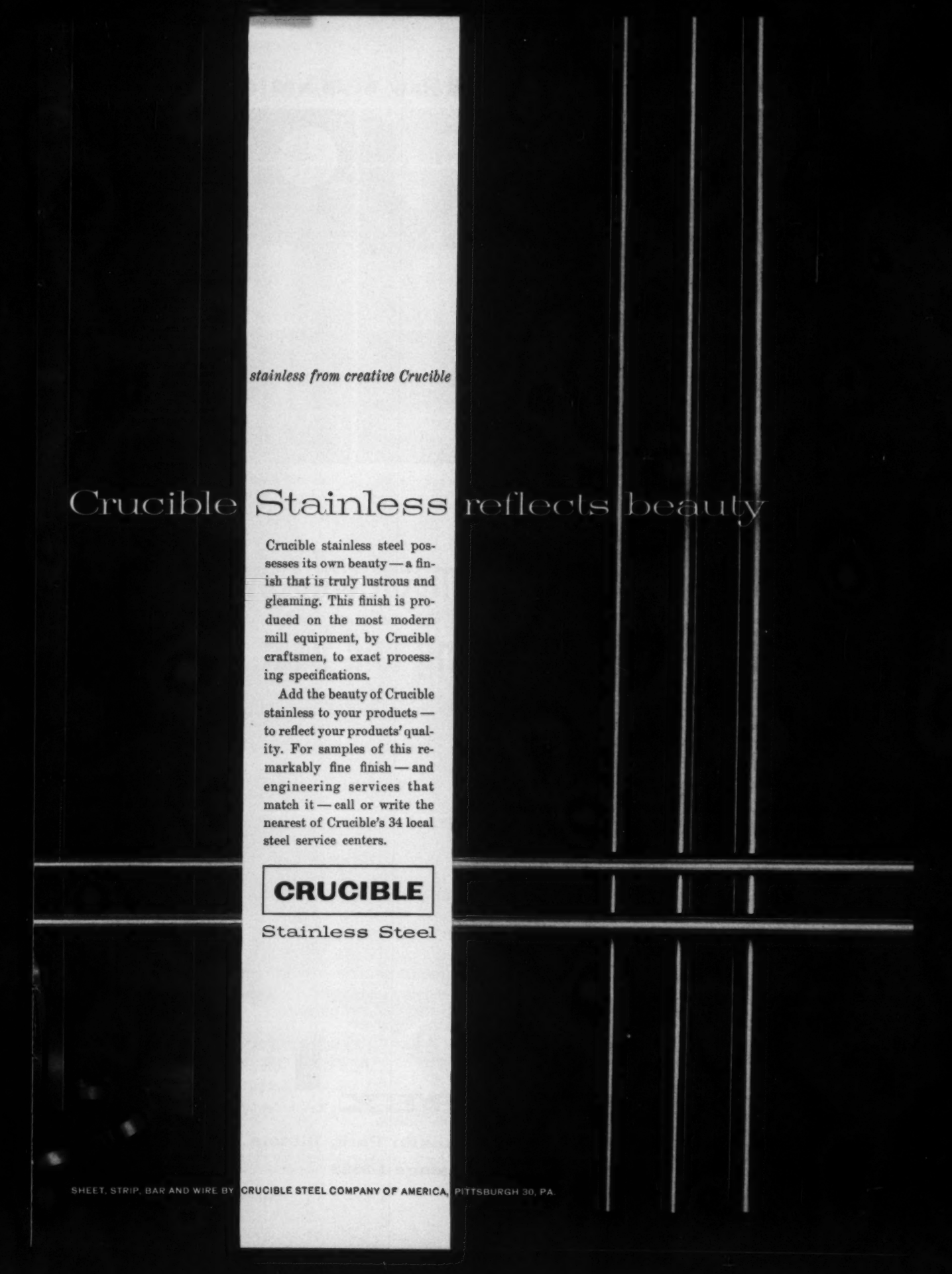
ELMES Hydraulic Presses and Equipment

American Steel Foundries / ELMES-KING Division, 1166 Tennessee Avenue, Cincinnati 29, Ohio

MACHINE TOOL EXPOSITION CHICAGO, Sept. 6-16

MMT-PE

GOWN BY FON TAYNE; STAINLESS



stainless from creative Crucible

Crucible Stainless reflects beauty

Crucible stainless steel possesses its own beauty — a finish that is truly lustrous and gleaming. This finish is produced on the most modern mill equipment, by Crucible craftsmen, to exact processing specifications.

Add the beauty of Crucible stainless to your products — to reflect your products' quality. For samples of this remarkably fine finish — and engineering services that match it — call or write the nearest of Crucible's 34 local steel service centers.

CRUCIBLE

Stainless Steel

SHEET, STRIP, BAR AND WIRE BY CRUCIBLE STEEL COMPANY OF AMERICA, PITTSBURGH 30, PA.

A DRAMATIC DEMONSTRATION OF THE NEW CLAD-REX 102 LAMINATE

Boiling water provides a positive test for two deep drawn* vinyl-clad parts. Neither special care in forming, nor post curing has been used to prepare either part.

Almost within a matter of seconds, the part formed of conventional vinyl-clad metal (at right) begins delaminating at the corners.

Even after as long as four hours of boiling, the part formed of new Clad-Rex 102 laminate (at left) still shows no delamination whatsoever.

New Clad-Rex vinyl-clad metal sharply reduces limitations in deep drawing and heat exposure

Has your interest in vinyl-clad metals been cooled because your product is deep drawn? . . . or because your product is exposed to elevated temperatures? . . .

Now, you can solve the problem with new Clad-Rex 102. It's a new vinyl-metal laminate that is, in effect, a single element of material. Clad-Rex 102 combines *for the first time* the ultimate properties of sheet metal with the optimum characteristics of vinyl.

Call or write for facts of this major technological breakthrough by the extensive research laboratories of Simoniz Company.

*Depth of draw equal to six times radius of corner

VINYL-METAL LAMINATES BY **CLAD-REX**® DIVISION OF SIMONIZ COMPANY

11506 W. King Street • Franklin Park, Illinois

Telephone: GLadstone 1-2323

22C

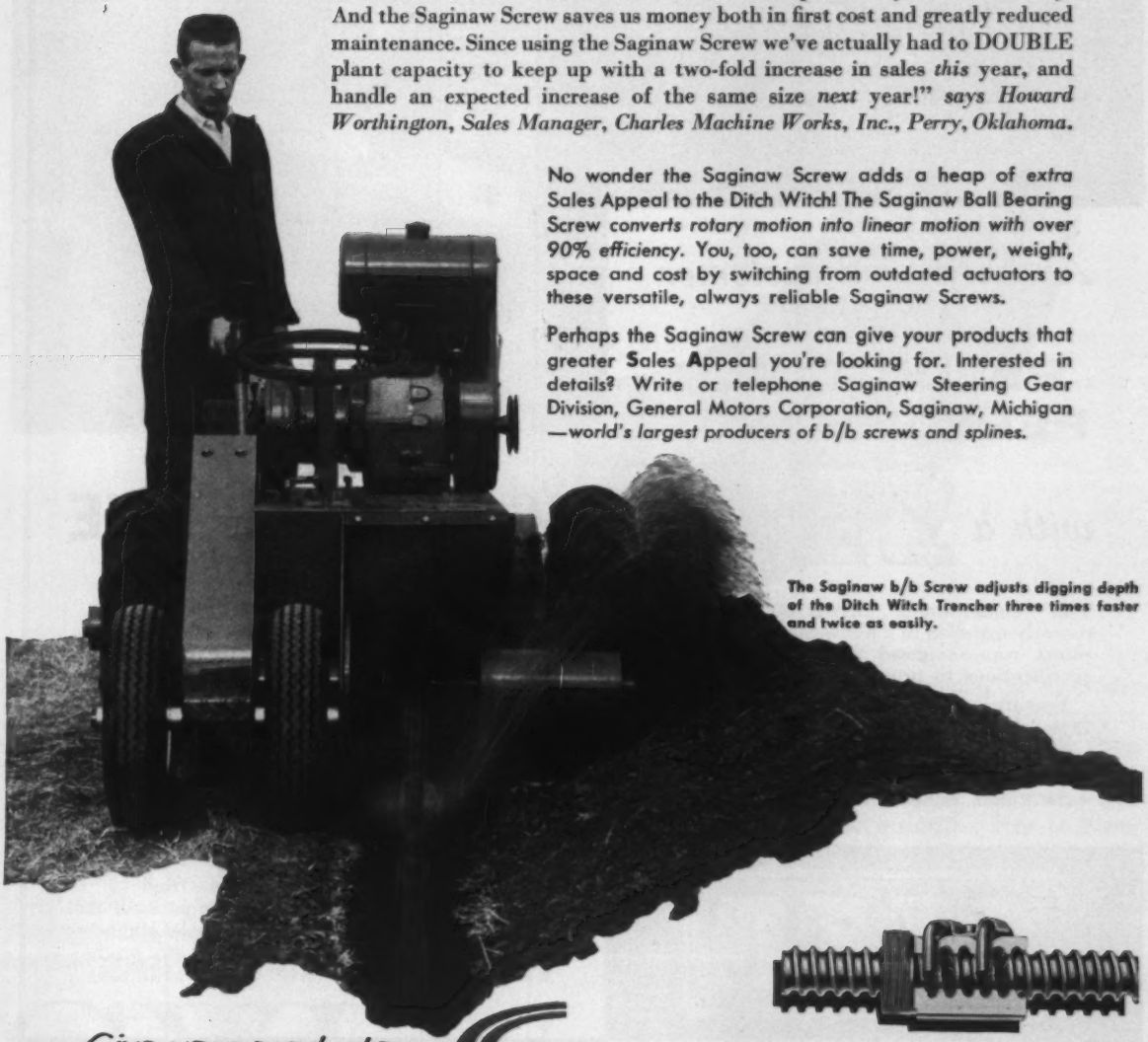
the SAGINAW b/b SCREW helps

Double Ditch Witch Sales in One Year!

"We've replaced an acme screw with a Saginaw Ball Bearing Screw to enable the digging boom of our Ditch Witch Trench Digging machine to be raised and lowered three times faster. It makes the operator's job twice as easy. And the Saginaw Screw saves us money both in first cost and greatly reduced maintenance. Since using the Saginaw Screw we've actually had to DOUBLE plant capacity to keep up with a two-fold increase in sales *this* year, and handle an expected increase of the same size *next* year!" *says Howard Worthington, Sales Manager, Charles Machine Works, Inc., Perry, Oklahoma.*

No wonder the Saginaw Screw adds a heap of *extra* Sales Appeal to the Ditch Witch! The Saginaw Ball Bearing Screw *converts rotary motion into linear motion with over 90% efficiency.* You, too, can save time, power, weight, space and cost by switching from outdated actuators to these versatile, always reliable Saginaw Screws.

Perhaps the Saginaw Screw can give your products that greater **S**ales **A**ppeal you're looking for. Interested in details? Write or telephone Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Michigan —*world's largest producers of b/b screws and splines.*

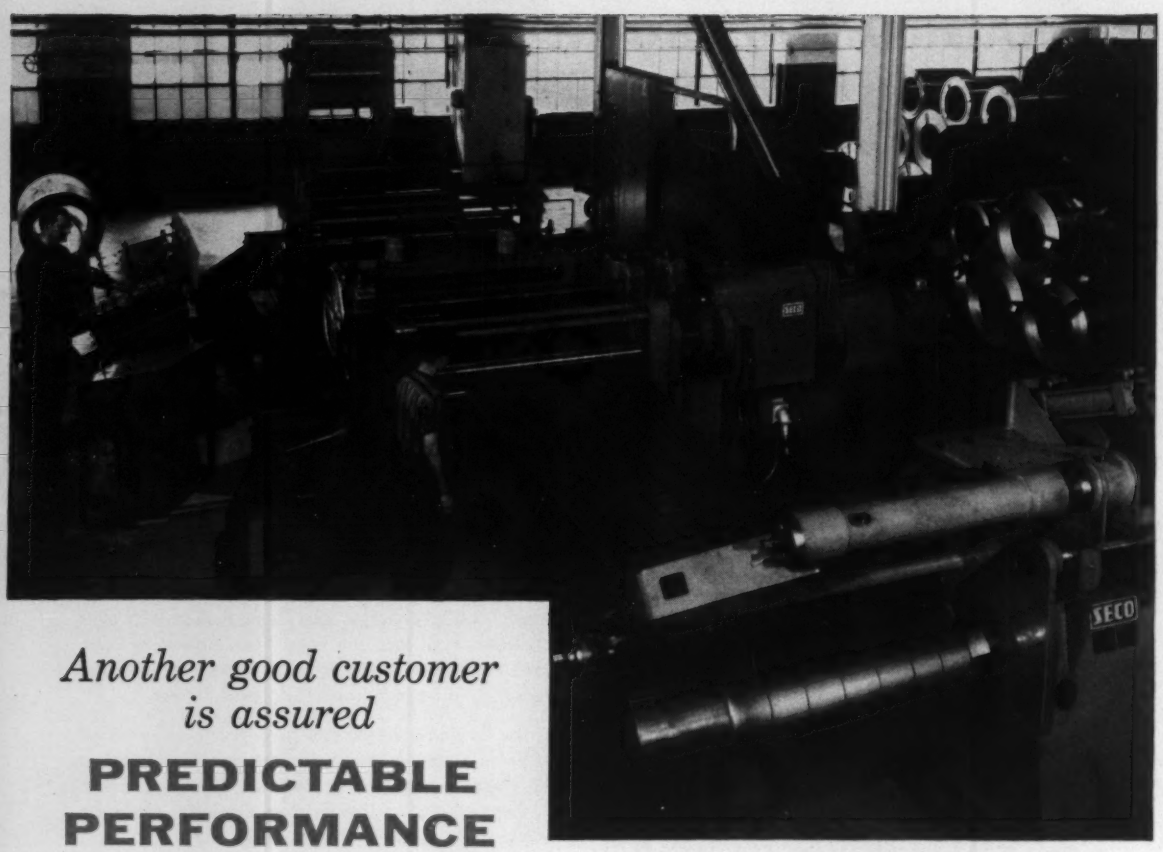


The Saginaw b/b Screw adjusts digging depth of the Ditch Witch Trencher three times faster and twice as easily.

Give your products NEW SALES APPEAL... switch to the **Saginaw**

ball bearing Screw

WORLD'S MOST EFFICIENT ACTUATION DEVICE



Another good customer is assured

PREDICTABLE PERFORMANCE

with a SECO **60" SLITTING LINE**

This "custom-built" SECO 60" Slitting Line, recently installed in a midwestern steel company's plant, was designed and built to their exact specifications to provide maximum performance.

Features of this custom-built SECO Slitting Line are:

- Coil weight capacity—40,000 lbs
- 225 fpm line speed with build-up to 735 fpm
- .1875 max. material thickness—5 cuts
- .020 min. material thickness—20 to 30 cuts
- Line arranged to handle sheets or coils
- Power driven hold-down rolls for uncoiling heavy gauge material
- Peeler and Straightener at uncoiler minimizes manual handling
- Variable speed D.C. drive
- Control equipment at operator's desk
- Over-arm separator at recoiler
- Removable housing assembly for quick knife changeover away from slitter

Whatever your requirements, SECO can provide a complete range of Slitting Lines—from 12" to maximum strip widths—as well as other Steel Mill equipment. SECO's staff of trained sales engineers are at your service to assist you with any production problem you may have. Call or write today.

SECO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION
CLEVELAND 22, OHIO

This is a throat insert for the nozzle of a solid fuel rocket engine—and it is made possible by a dramatic new isostatic pressing and sintering operation at Sylvania. This operation enables Sylvania to make full use of tungsten, molybdenum and their alloys. It assures rocket and missile manufacturers of a steady and dependable source of supply for the desired refractory metal blanks and ingots.

Forging blanks are no problem for the Sylvania isostatic presses and sintering furnaces; nor are preform blanks for machining or electrodes for arc casting. Sylvania is also equipped to "green machine" the blanks or furnish them to exact finished tolerances.

If refractory metals are your materials, and special shapes, sizes or quantities your problem, you'll find the quality and price Sylvania offers to be of distinct advantage. For details, call your Sylvania representative, or write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**

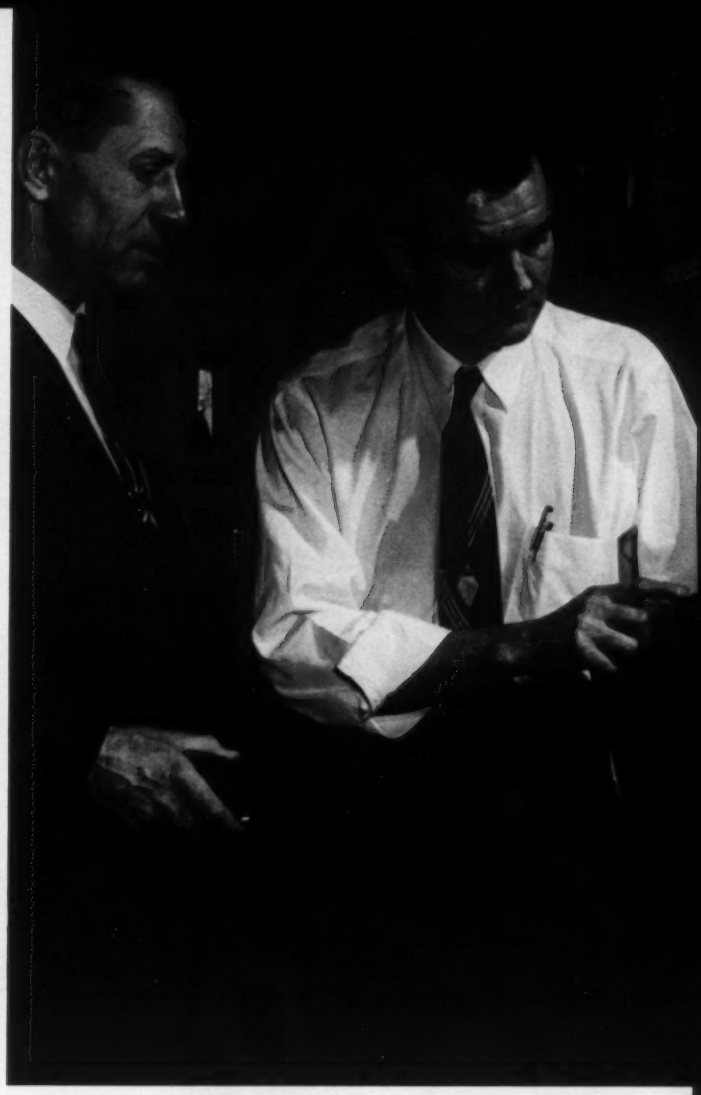
Iron Fireman Manufacturing Company changes to Gulfcut® oil,

GULF MAKES THINGS

A machining job that had been a problem for years was the test given a Gulfcut oil at Iron Fireman Manufacturing Company, Cleveland, Ohio. The job was hobbing 78-tooth, combination 6-8 pitch main drive gears of UMA-3 forging steel. Until the test, hobs had to be reground after every eight gears—once every cutting cycle.

By using Gulfcut 21C oil, Iron Fireman engineers found that they could get the same tolerances and the same production as before, and that they could cut approximately 30 gears or nearly 4 cycles before re-grinding. In addition, they were grinding one-third less off the hobs than before!

"With 275% increase in hob life, we're getting pretty close to optimum on this job," says Stanley J. Kovac,



At right, C. J. Wires, of the Production Engineering Staff, Iron Fireman Manufacturing Company, with T. F. Irving, Gulf Sales Engineer who recommended Gulfcut.

More than 300 kinds of steel, cast iron and brass gears are hobbed by Iron Fireman Manufacturing Company, all with the aid of Gulfcut oils. Pictured here is a 12-tooth, 6 pitch Ledloy steel pump drive gear, O.D. 2.333, tolerances +.0000, −.0015. Oil is Gulfcut 21C.

increases hob life 275% . . .

RUN BETTER!

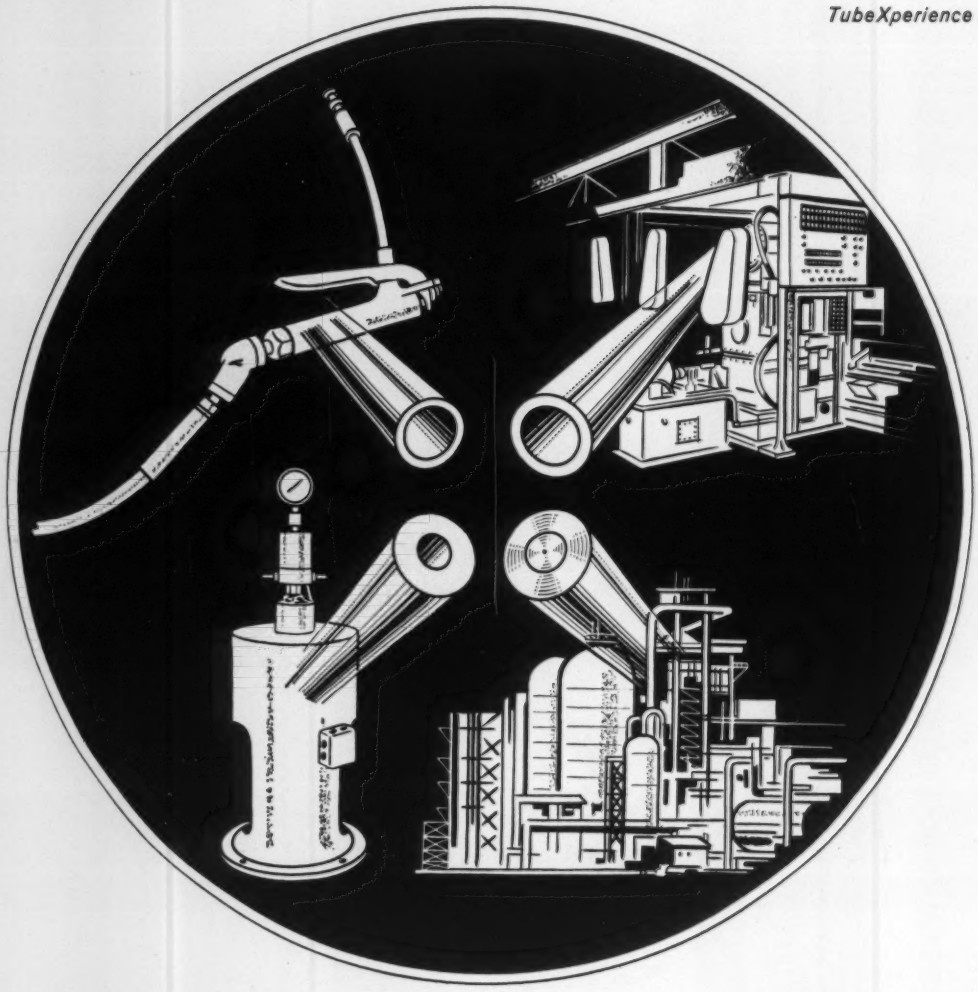
Chief Production Engineer. "Performance like this has proved Gulfcut oil to us. We're now using it on all gear cutting operations. We cut 300 kinds of gears, of brass and cast iron, as well as steel."

Do you have a tough machining problem? See how Gulf makes things run better! Just call a Gulf engineer at your nearest Gulf office.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

SP-9822



Superior tubing makes pressures behave

whether 125, 5000, 30,000 or 100,000 psi

Superior small-diameter tubing makes pressures behave whether low, medium, high or super. Superior pressure tubing can be roughly divided into two groups: commercial pressure tubing for use in a range up to 20,000 psi; premium super pressure tubing to handle pressures from 15,000 to 100,000 psi. Both ranges can be handled effectively by a number of different analyses, depending on service requirements. Typical applications for Superior general-purpose pressure tubing include pressure tools, machine tools, heat exchangers and condensers. Superior super-pressure tubing is found in hydrogenation process equipment, high-pressure autoclaves, and pilot plant installations in chemical and oil refining plants.

All Superior pressure tubing offers many advantages. It helps prevent critical failures and downtime. It assures long service life, high fatigue strength, excellent corrosion and chemical resistance. In the range from 15,000 to 100,000 psi, Superior super-pressure tubing is a premium product. It is produced from specially selected raw materials. Inside surfaces are conditioned to remove fissures and other defects. During processing, special degreasing operations are performed, and the inside diameters are conditioned to insure a clear, smooth surface. Two types are available: a single wall mechanical tubing and a double wall, or composite unit, made from two thinner tubes. It is produced in an annealed condition and in ⅛ hard temper, and to mechanical properties specified by the customer. All Superior pressure tubing is 100% hydrostatically tested to recommended working pressures, and rigidly inspected for defects.

We can probably help you with any tubing problem that may confront you . . . in pressure, super-pressure or other applications. Contact us and feel no obligation. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

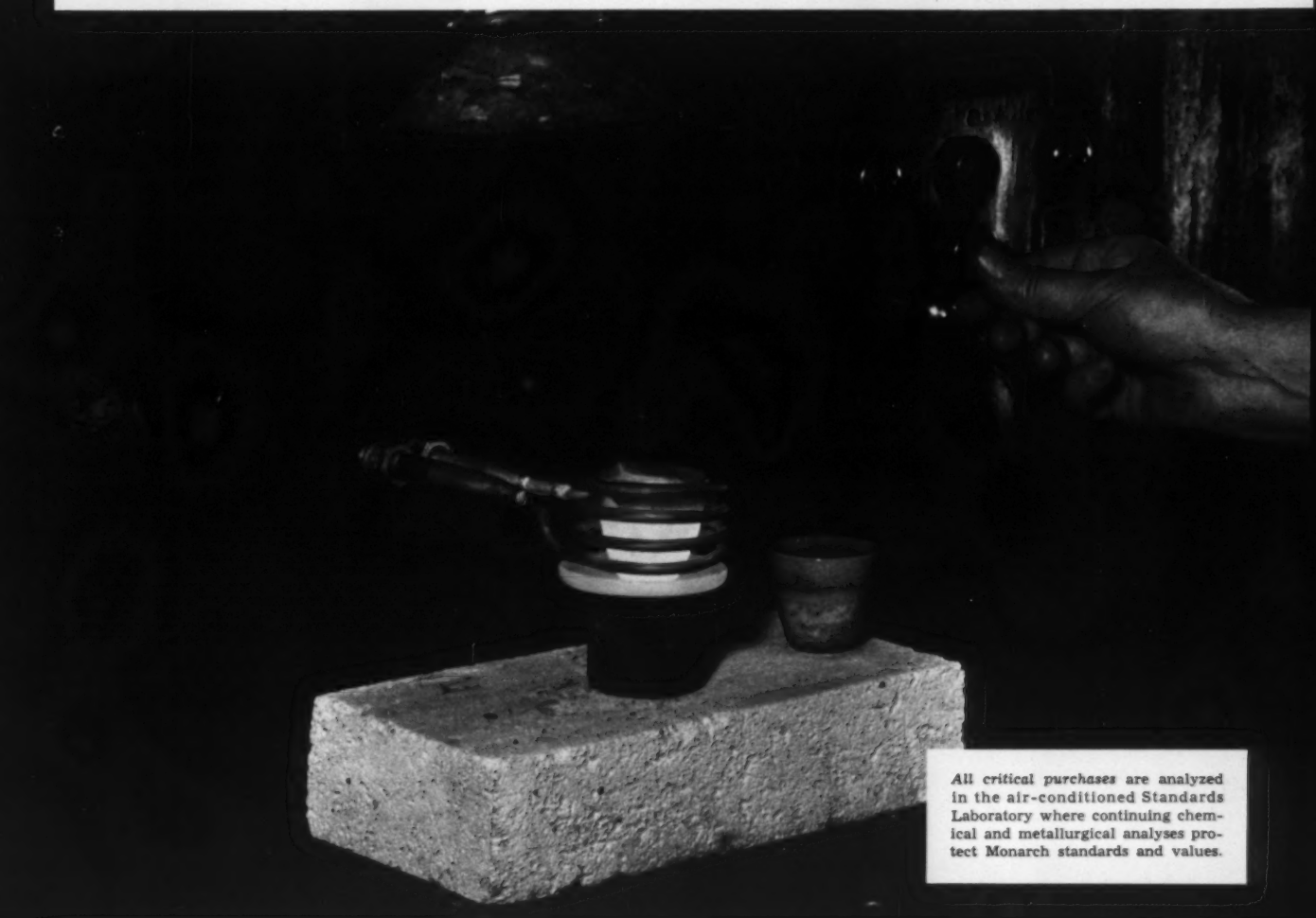
The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅜ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

He's making a Monarch Lathe...



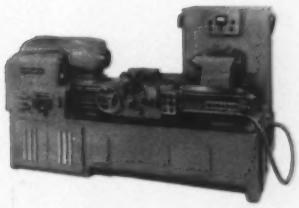
All critical purchases are analyzed in the air-conditioned Standards Laboratory where continuing chemical and metallurgical analyses protect Monarch standards and values.

One example of where the extra values come from—in your MONARCH Lathes

When we tell you that we can set up your job on modern Monarchs in our Turning Clinic, and then show you important production increases, vastly improved finish and longer tool life—then, we'd better have the lathes to do it.

Have we? Consider the casting control test shown here. Our own process, it keeps our metallurgical engineers constantly alert to any casting deviation from our quality standards—and ready to pass along to our foundries the results of our own research. Every lathe bed, large carriage and slide is cast with a test-log which we analyze for hardness, micro-structure and chemical composition.

This is only one of many Monarch continuing quality control and research analyses. Their sum total, plus advanced engineering, plus meticulous manufacturing, is the modern Monarch—with its intrinsic, often exclusive values, the ultimate in lathe bargains. *So we repeat our invitation. Date?* THE MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO



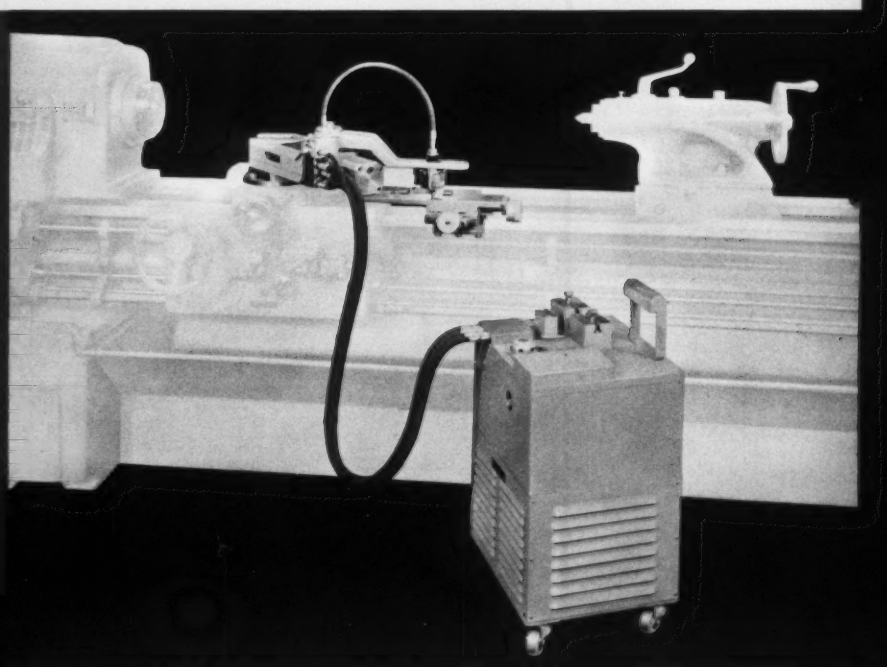
WHEN YOU BUY VALUE
MONARCHS COST LESS

Monarch
TURNING MACHINES

VISIT MONARCH—*We'll turn your part to return you profit*

Monarch's Building Higher Production for Tomorrow's Boom

THE LATHE ON YOUR FLOOR WILL PRODUCE MUCH MORE



3..The New Air-Tracer Pak... Portable Unit for Standard Monarchs in Your Plant

Here's a real turning technique breakthrough! The Air-Tracer Pak is just what the name implies—a portable, easily applied device for temporarily or permanently adding to many standard Monarchs in your shop *all the advantages of Air-Gage Tracer production.*

And what are those advantages? In a nutshell, this, the most accurate duplicating method in general use, always outproduces manual operation up to 8 to 10 times. It sizes automatically and, using only a single running tool, is ideal for *small lot repetitive work* without the need for expensive form tools or multiple tool setups.

Its accuracy of ± .001" on most work often cuts in half the stock left for grinding; sometimes eliminates grinding and polishing. It allows complete setup change in as little as 15 to 20 minutes and tool change in 1 minute. It is also the simplest, most trouble-free of all lathe duplicating units.

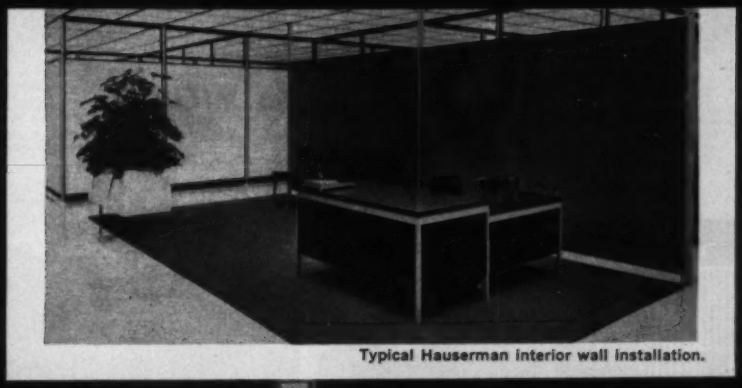
The photos show how the tracer slide assembly quickly replaces the regular compound rest on the cross slide. Note the template support and micrometer dials—the portable, completely self-contained power unit at the front of machine with air supply and electrical connections in the base.

Presto! it's on. And presto! it's off. Yet it's an adaptation of the time-tested swiveling Air-Gage Tracer with the versatility to handle the more complex turning, boring and facing jobs.

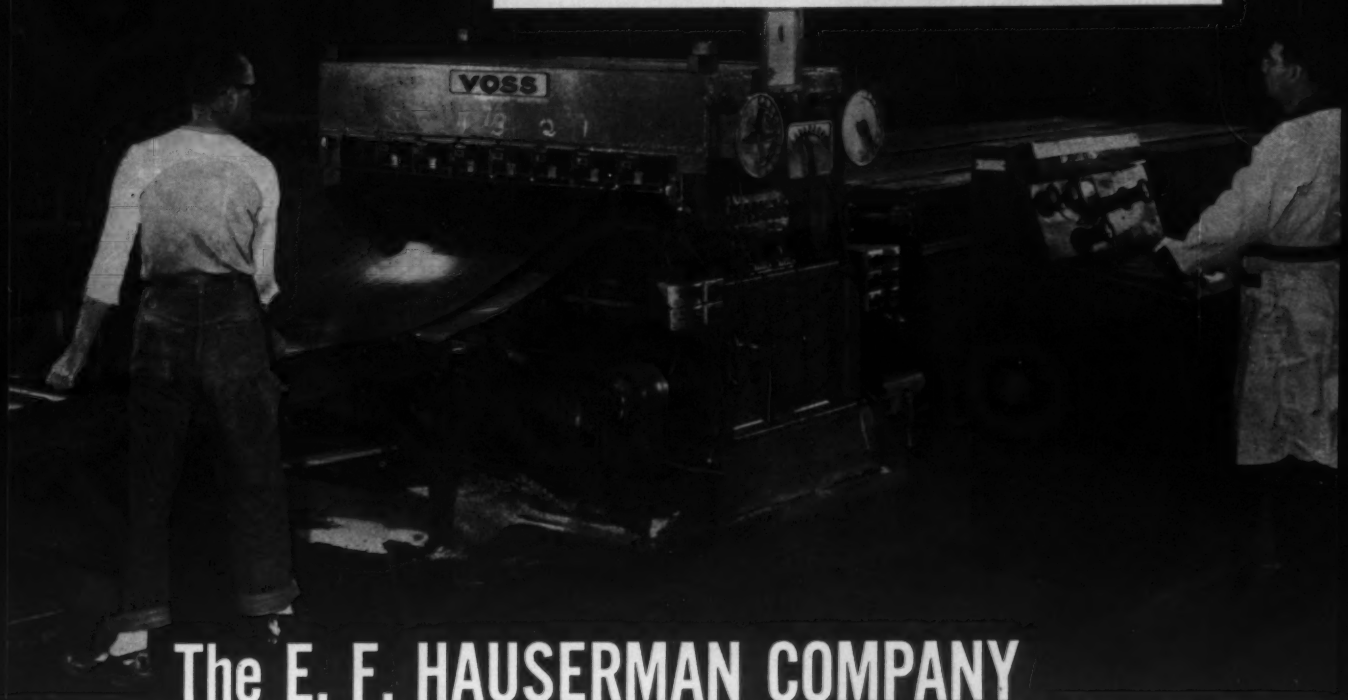
This is news! Write—or phone today—for the full story... The Monarch Machine Tool Company, Sidney, Ohio.

Monarch
TURNING MACHINES

IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER



Typical Hauserman interior wall installation.



The E. F. HAUSERMAN COMPANY Gets Dead Flat Sheet Steel with VOSS Roller Levelers

...and saves time and money doing it!

Hauserman standards are *tough*. Every sheet of steel used in a Hauserman movable interior wall is inspected on a slate table for absolute flatness. Before Voss levelers were installed, the company used stretcher-leveled sheets ... and still had to reject 33% as not meeting their severe specifications. Now steel is ordered in coils, and Voss-leveled on their own processing line. Rejects are consistently held under 5%, and the company gains the economy and flexibility of handling steel in coil form. Voss levelers have operated at Hauserman for 10 trouble-free years. They help the company maintain the most rigid quality standards in the movable partition industry.

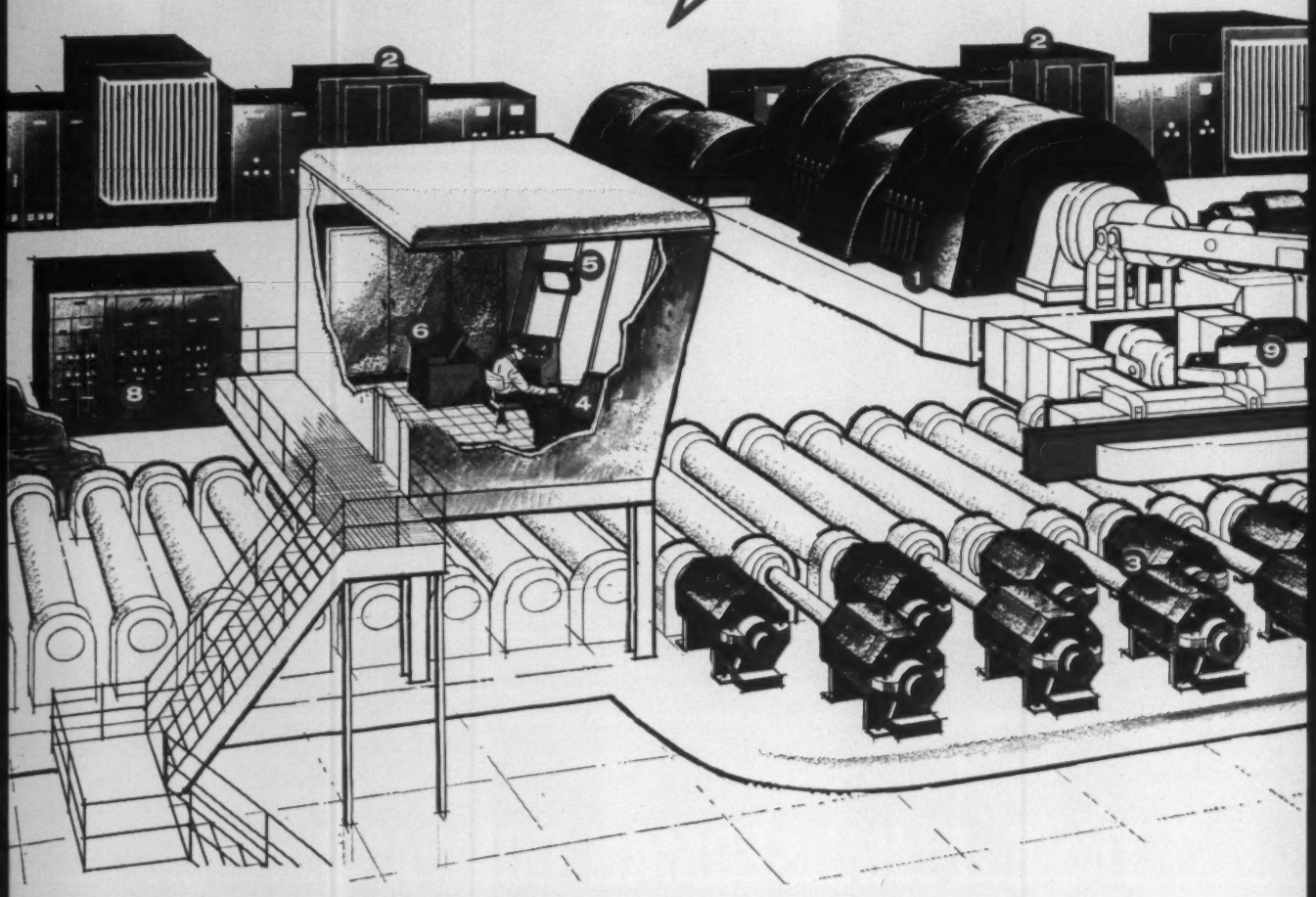
Voss levelers are currently at work in plants of many primary steel and aluminum producers and major fabricators. Applications include high speed galvanizing lines, hot and cold rolled shear lines, steel plate, aluminum sheets and coils, and others. Let Voss put its experience to work on your leveling problems.

Voss ENGINEERING CO.

7301 Penn Ave. Pittsburgh 8, Pa. Churchill 2-4422

FOR QUALITY . . . PRODUCTIVITY . . . PROFIT

REVERSING HOT MILLS
automated by General Electric



General Electric's step-by-step approach to automation is . . .

The Best Way to Meet the Competitive

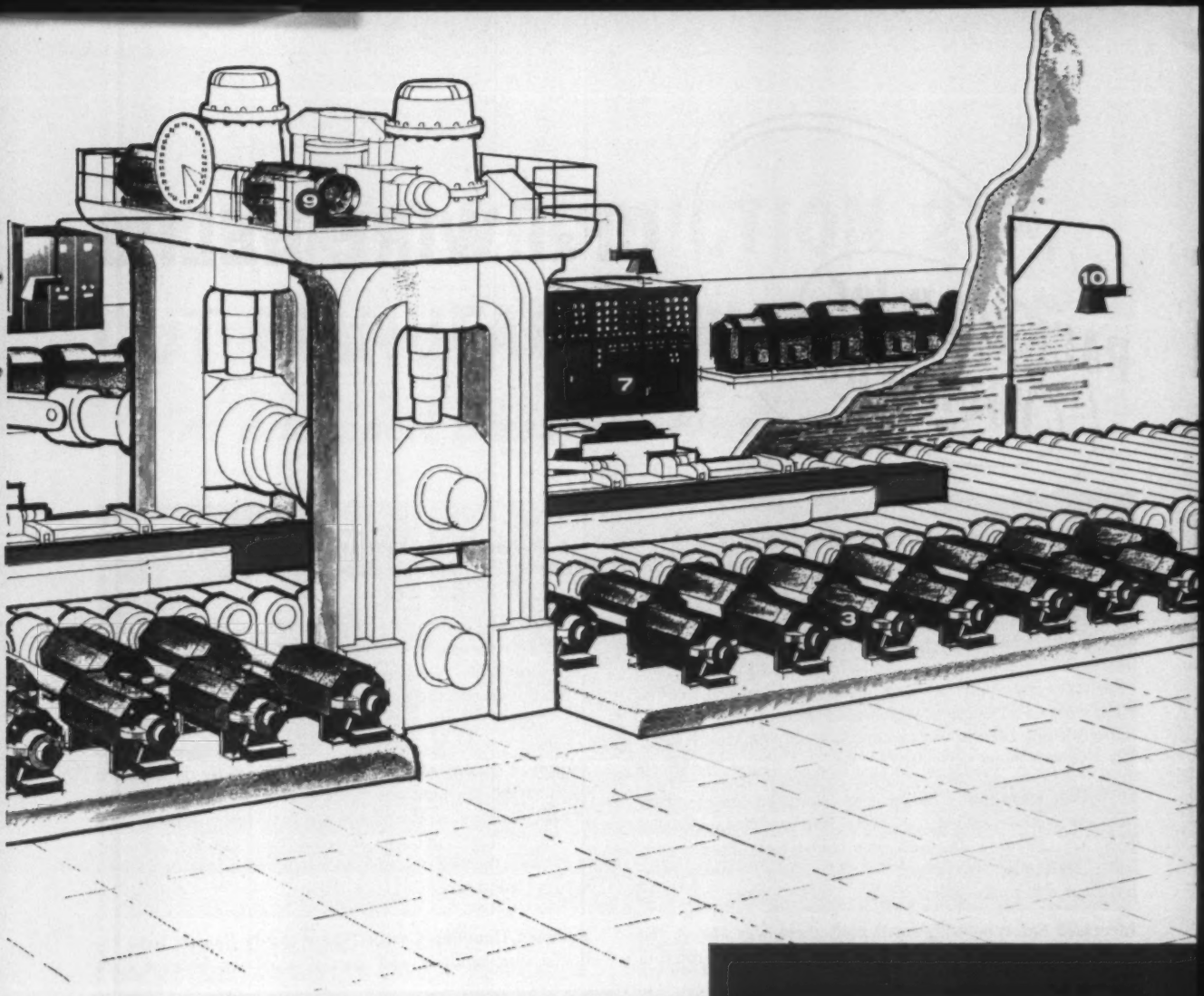
Competition in the primary metals market is on the increase today as never before. As management looks for ways to meet this challenge, their attention is turning to automation to improve production efficiency, operating costs, and product quality. But economic considerations of primary metals producers eliminate any thoughts of "overnight" automation with its hasty planning, uncertain costs, and unpredictable results.

GENERAL ELECTRIC'S PLAN is based on a series of modernization steps which combine economic soundness with predicted benefits of automation.

For example, many Reversing Hot Mills are producing automation benefits today as a result of modernization programs begun four years ago. Application of pre-programmed drafting practices is resulting in fewer passes, higher and more consistent product quality, lower scrap. Drastically reduced maintenance and equipment abuse is resulting in lowered operating costs. Automation flexibility is allowing product variations consistent with changing market requirements.

Consider the automation of your Reversing Hot Mill: As a first step, General Electric will help you survey your mill to determine which electrical-system components will best meet the precise demands of automation. From this survey comes a series of installation steps sequenced to keep downtime at a minimum and at the same time, make your basic system suitable for the next step—automation. As these products are installed real savings start, because General Electric system components are designed to reduce installation and maintenance costs while providing the precise response and maximum reliability demanded by automation.

THE NEXT STEP in General Electric's plan is the application of a programming system and new sensing devices, system-engineered to provide completely automatic operation of the mill and associated auxiliaries. Then it becomes possible, through the addition of an information-handling system, to observe all mill operations, compare these operations with current job specifications and, if necessary, make instant adjustments in rolling instructions which are signaled to the mill drive system after each pass.



Challenge of the 60's

Even greater savings begin in this step as maximum utilization of the mill becomes consistent with the limits of the mill, the drive system, and even the metallurgical limits of the ingot or slab. After automation of your mill has been completed, new product and system technology makes it possible to link associated production processes, such as the soaking pit, ingot buggy, and reheat furnaces, into an automated production area. Then this area can be integrated with other areas to provide completely automatic production scheduling and manufacturing throughout the entire plant. Over-all performance will be in direct accord with management decisions based on all of the many complex variables that determine profitable plant operation.

Let General Electric begin working with you now in meeting your competitive challenge. You'll find the capability to provide any degree of automation a reality at General Electric today. For complete details, call your nearest Apparatus Sales Office. General Electric Company, Section 659-01, Schenectady 5, New York.

SYSTEM-ENGINEERED ELECTRICAL EQUIPMENT FOR THE COMPLETELY AUTOMATED REVERSING HOT MILL

1. "TOP-FORWARD" Main Drive Motors
2. Ignitron Mercury-arc Rectifiers, using new Silicon Controlled Rectifier firing circuits, or Motor-generator sets, for main d-c power supply
3. MD-600 Auxiliary Mill Motors
4. Mill Operators' Control Console, including X-Ray Sensor Read-out
5. Closed-circuit Television
6. Process Control System incorporating GE312 General Purpose, Digital Control Computer
7. DIRECTO-MATIC Main Mill Control
8. DIRECTO-MATIC Static Program Control equipment
9. MD-600 Screw-down Motors
10. Sensing equipment for process evaluation

AUTOMATION THROUGH MODERNIZATION

GENERAL ELECTRIC

CF&I WIRE HELPS

PACKAGED for YOUR PRODUCTION

"CF&I-Wickwire Wire Spiders give us 25% increase in productivity...20% less downtime... 80% less scrap loss," says Mr. Robert Mangold, Production Superintendent.

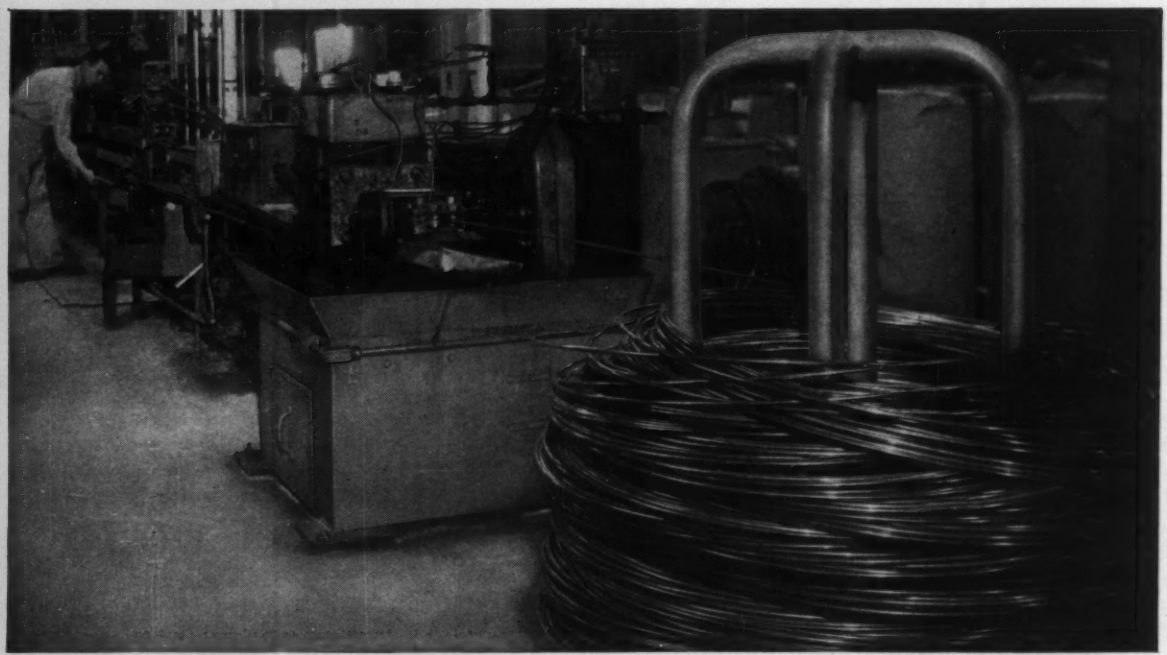
25% Increased Production—"Previously it required fifteen or twenty minutes to reset *each* of the eight to ten small coils used to feed our forming machine," explained Mr. Mangold. "For every eight hour shift, we lost two hours of production. Now with CF&I Spiders—which hold up to a 3000 lb. continuous length of wire—we change coils only once each shift. We save two hours per shift."

80% Less Scrap Loss—"Waste is an important consideration because we lost several feet every time we changed coils. Now we use only one and one-third CF&I Spiders each shift—instead of the eight or ten coils used previously—and have cut our waste 80%."

Increased Safety—"With small coils there was always the danger of the finishing end springing loose while rotating and striking equipment and personnel. With heavy-weight CF&I Spiders which revolve on a turntable while our machine withdraws the wire, the finishing end is securely anchored, reducing the possibility of tangling and eliminating this danger."

Improved Quality of End Products—"Since we do not have to reset the machine ten times a shift, the quality of our product is more uniform and we have fewer rejects," declared the superintendent of production. For a continuous operation, the end of one Spider can be butt welded to the start of another.

Reduced Handling Costs—"These sturdy Spiders have reduced our handling and storage problems, because each



INCREASE PRODUCTION 25%, CUT MANUFACTURING COSTS

At Bridgeport Brass Co., Flemington, N. J.

Spider contains as much wire as eight small coils. Unloading is safe and quick—one man with a fork lift can do the job easily, freeing several men for other important operations," Mr. Mangold pointed out.

Simplified Inventory Control—No need to sort through piles of wire coils...simply count the number of upright Spiders.

Save Storage Space—Spiders are stored compactly, requiring much less space than cumbersome coils. For maximum economy of space, Spiders can be doubled-decked which is equivalent to stacking 20 mill coils of 300 lbs.

Every CF&I Wire package offers one or more of the following benefits:

- **Reduced downtime through extra long continuous lengths of wire**
- **Simplified inventory control**
- **Fast, economical unloading and in-plant handling**
- **Continued cleanliness of the wire**

A CF&I representative will be glad to discuss your operation with you and recommend the wire package that will help save you time and money.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal

CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

6930

FIVE-DEEP

Traveling four times as far as the moon

to help you profit with UCM's "FIVE-DEEP" Ferroalloys

1 **Customer Service,** ready as your phone, brings Union Carbide Metals' field engineers to your melting plant—from any of 9 sales and service offices. In providing on-the-scene assistance, they gladly make available UCM's integrated experience in the application of ferroalloys to various melting practices.

Lately, their travels to mills and foundries have soared to well beyond the million-mile mark—each year! This customer service is just one of the 5 intangible but ever-present extra values of UCM's FIVE-DEEP alloys which mean better products and bigger profits for you. The others:

2 **Technology**—many million dollars worth a year—helps you produce better, more profitable metals. UCM's 600-man research and development center is the birthplace of hundreds of new alloys.

3 **Unmatched Facilities** free you from delivery worries. Only UCM gives you 6 plants—3 with their own power facilities—and 17 warehouses, all located for fast shipments by rail, truck, or water.

4 **Global Ore Sources** assure you uninterrupted supplies of ferroalloys. UCM's close association with world-wide mines provides dependable raw material sources.

5 **Strictest Quality Control**—with over 100,000 tests per month from mines to shipment—makes sure you always get alloys of uniform size and analysis, with minimum fines, lot after lot.

For better metals, production economies, bigger profits, insist on UCM's FIVE-DEEP alloys. Union Carbide Metals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y., producer of "Electromet" brand metallurgical products.

"Union Carbide" and "Electromet" are registered trade marks of Union Carbide Corporation.

UNION CARBIDE METALS

Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

MANY PURCHASING AGENTS FURTHER REDUCE INVENTORIES. The Business Survey Committee of the National Association of Purchasing Agents reports for July that 33 pct of those surveyed say they are reducing inventories. Only 15 pct tell of greater inventories than in June. The remaining 52 pct report unchanged stocks.

PERSONAL INCOME IS RUNNING NEARLY 5 PCT HIGHER than a year ago. Commenting on this figure, the Mellon National Bank observes: "In contrast to a retail sales gain of only 3 pct, a further potential would seem to exist for expansion in sales."

THE MARKET FOR METALS IN MISSILE WORK is a broad one. "Hardening up" of ICBM missile silos is already underway and is a growing business. One Chicago steel company has just signed a contract for 12,000 tons of concrete reinforcing bars for missile silo construction.

GOVERNMENT PRIME CONTRACTS TO SMALL CONCERNS ARE AT ALL-TIME HIGH. During fiscal 1960 small concerns were awarded 24,152 contracts valued at $878,168,714, up $30 million from 1959. Another sign of strength in this growing market: June 1960 contracts amounted to $172.7 million, up $30 million over June 1959.

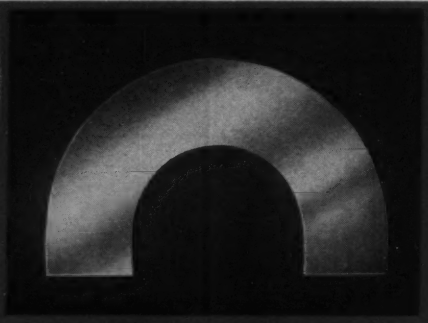
HIGHWAY FUNDS FOR 1962 ARE APPORTIONED TO STATES by Commerce Dept. Just under $3 billion has been apportioned for the fiscal year 1962 which begins July 1, 1961. This action provides almost a full year's lead time to the states for planning their use of the money.

SOUTH AMERICA LOOKS TO U. S. MACHINE TOOLS. Just placed with Detroit area special machine tool shops is a multi-million dollar order for block and head lines for the new Ford export version of the compact car. Industry sources say the new car will be made in Argentina.

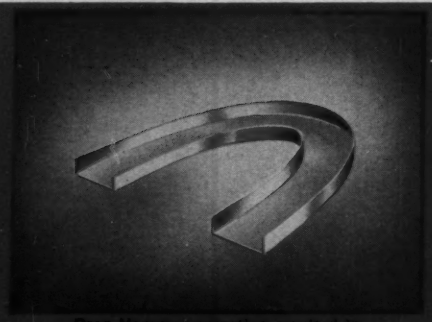
MACHINE TOOLS SHOW FIRST HALF SALES STRENGTH. Shipments of metal cutting type machine tools totalled $265.9 million for the first six months of 1960, up 41 pct over first half 1959. Net new orders of $257.4 million showed a gain of 9 pct. Shipments for metal forming types amounted to $72.6 million during the first six months, up 21 pct over the same period in 1959. Net new orders of $78.3 million were up 15 pct.

*$100.00 per part production SAVINGS.....

OLD METHOD



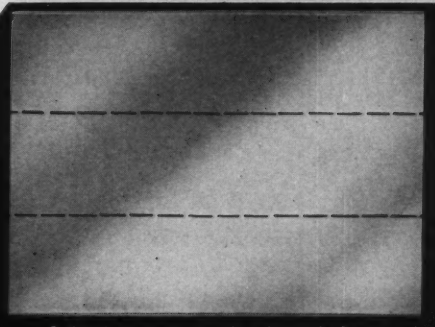
Cutting out the blank in this titanium piece was not only tough, but machine work is extensive.



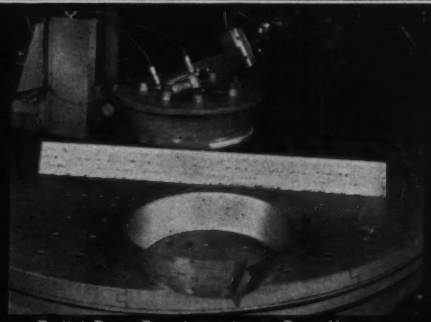
Drop Hammer operation resulted in heavy scrap loss.

Finished part

...with the BATH METHOD



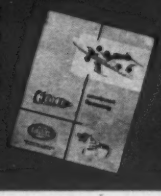
3 titanium parts per piece instead of one.



Radial Draw Forming prior to Drop Hammer operation eliminated metal distortion, greatly reduced rejects.

Finished part

*The illustrated titanium part was not only expensive to make by old methods, but because of metal distortion, the part reject loss was tremendous. By STRETCH RELIEVING the titanium, using a Bath Radial Draw Former, part rejects were practically eliminated . . . in short, a method of forming shapes that keep their shape . . . even after heat treating . . . *Send for the plant facilities folder, it illustrates both the standard Radial Draw Forming facilities, plus a completely new series of HIGH SPEED production forming machines.*



THE CYRIL BATH COMPANY

32340 AURORA ROAD • SOLON, OHIO
(LOCATED IN THE GREATER CLEVELAND AREA)
Manufacturers of Radial Draw Formers • Dies • Tools
Press Brakes • Tangent Bending Segments Presses • Press Type Brakes • Special Machines

Purchasing Teamwork Is Way To Lower Costs, Raise Profits

Effective communication between purchasing and other departments is seen as key to more profitable purchasing.

Upgraded purchasing men using scientific approaches to buying can improve performance of other departments.—By J. D. Baxter.

■ It happens every day—and in the best of companies:

The engineers needed some technical assistance before making up final prints on a proposed plating installation. They called in a local consultant who was known by one of the engineers. Two days later the prints were approved by a vice president—and so was an invoice for the consultant's fee.

This was money thrown away. The purchasing department had excellent relations with three plating supply houses; any one of them would have been willing to furnish expert assistance at no charge.

Down the Drain — In another case, a production manager glumly watched sheet steel scrap pile up beside stamping presses. He knew the waste per sheet seemed excessive. But these were standard size sheets and non-standard ones would cost too much for the run sizes.

The truth was that a local steel service center had a ceiling-high stock of sheet with the same specification in an off-size almost ideal for the production manager's needs. The service center salesman had just called on the company purchasing agent the day before. He offered the sheet on a continuing basis. But—he was told the company's didn't use that size.

More profits went down the drain.

Poor Communications — These are cases where communications between purchasing and other departments had broken down. Profit leaks can add up quickly when cost reductions in purchased goods and services are missed.

Cost of purchased goods and services average over 50 pct of gross sales income in U. S. manufacturing companies.

And, as purchasing agents like to point out, a dollar saved is a dollar into profits. At a 10 pct profit on sales it would take $10 more in sales to get one dollar into profits.

Purchasing Service — Says Kenneth R. Geist, director of purchasing, Allis-Chalmers Co., "Purchasing, a profit-making function, is also

David S. Gibson
Worthington Corporation

John P. Moorhouse
Standard Pressed Steel Co.

Kenneth R. Geist
Allis-Chalmers Co.

recognized as a service department and is set up to perform various types of services to other departments."

Mr. Geist is chairman of the Inter-Departmental Relations Committee of the National Association of Purchasing Agents. He draws on experience gained with this committee in saying that good communications is the number one key to realizing more profits through efficient purchasing.

This is a two-way street, according to Mr. Geist. Purchasing must prove itself to other departments as interested and helpful in solving their problems relating to purchased materials and services.

"For example," says Mr. Geist, "a reasonable attitude in timing a request to actual need gives a purchasing agent a chance to seek competitive bids. It allows for the best possible choice of supply. Then, too, flexibility in specifications is needed in attracting more comprehensive bids, essential for an economical selectivity of items."

Early Teamwork — Profitable teamwork with purchasing starts when a need for an item or service is first conceived in a company.

Says Mr. Geist: "In the pre-production planning phase of product development, the relationship between engineering and purchasing is important. At this point, the abilities and knowledge of each of these functions must be fused into a coordinated effort to build preplanned value into the product."

Policy Manual—At Worthington Corp., David S. Gibson, vice president of purchasing and traffic, finds a detailed and well-circulated purchasing policy manual is valuable in building communications. But he states, "Common grounds for face-to-face meetings can implement these manuals. We encourage our buyers in active participation in committee work.

"In Worthington's profit-improvement program, purchasing has instigated and affected more savings than all the other divisions combined." Mr. Gibson points this out to illustrate the extent that purchasing can help other divisions to get greater profits from their operations.

Open Mind Needed—Mr. Gibson feels that non-purchasing people should keep an open mind to the suggestions of purchasing. "Cost reductions, savings through material substitutes, and so on, resulting through cooperation with purchasing will help the operating department as much or more than the purchasing department.

"And there should be no head-bumping for credit for realized savings or increased efficiencies. Real teamwork is the answer."

Upgrading—Executives are generally turning more to help from purchasing as they realize there has been an upgrading lately in the professional caliber in the field. Companies with sales efforts wrung dry in a sluggish economy, are turning more attention to cost control programs as a springboard for profits. With material and service costs the biggest expenditures in most manufacturing companies, this is where the greatest opportunities lie in cost-control efforts.

And purchasing is the department in position to tap the huge vendor idea pool and bring cost reduction ideas into a company.

At Standard Pressed Steel Co. headquarters in Jenkintown, Pa., for example, 12 buyers see an average of 67 salesmen a day. This is about 18,000 contacts a year. While many are repeat calls, it still gives an idea of the number of ideas that are put to average purchasing departments.

Use Engineers—Company executives used to "purchasing paper-pushers" who "don't understand our needs" are now often getting pleasant surprises when they turn to purchasing. At Worthington, for example, when hiring college men for purchasing, preference is given to graduate engineers with commercial sense. These men are put through a general training course followed by a six-month training course in purchasing. They are then assigned as junior buyers.

At Standard Pressed Steel, purchasing director John P. Moorhouse reports that one-third of his buyers have engineering backgrounds.

Keys to Buying Teamwork

- **Learn about purchasing operations and services in your company.**
- **Make clear to purchasing your departmental objectives and operations.**
- **Be open-minded to purchasing suggestions.**
- **Analyze purchased material or service cost items in your budget.**
- **Ask purchasing's aid in cost control of your purchased items.**
- **Make all contacts outside the plant through purchasing.**
- **Assign liaison man to keep open communication lines with purchasing.**
- **Use negotiation experience of purchasing on capital equipment buys.**
- **Adhere to proper requisition and purchase procedure.**
- **Give purchasing proper credit for assistance in making savings.**

Buying is made a science at SPS. Metal buyers are thoroughly grounded in metallurgy and production needs. One man, a former chief engineer for the company, has the position of machine tool analyst. He coordinates and approves the buying of all production machinery.

Value Analysis—One of the advances made by purchasing departments has been in the field of value analysis. Purchasing personnel, through company training programs, association meetings, seminars, and other means have become leading users of this scientific approach to better buying.

What can this approach by purchasing do for other departments? In one case at Worthington, $18,000 yearly was saved when a value analysis proved that a standard bronze ingot could be used instead of a long-used off-standard one.

This was not just a feather in the cap of the purchasing group. It was a real saving in a production department that made for better performance by the department head.

Cost Savings—Probably the best place for a buyer to "earn his letter" is in making cost savings.

One big area of cost-saving that is lost when purchasing is by-passed is standardization. Says Mr. Geist: "Cooperation between product engineering and purchasing is essential for an effective standardization program."

Capital Equipment—One area in which purchasing agents have been too often bypassed is in capital equipment planning and procurement.

Mr. Geist points out a case of a facility expansion where an item for foundry application was routinely requisitioned. Specifications indicated the cost at several thousand dollars. The purchasing specialist, by working closely with plant engineering demonstrated that several other models and types were also available. By the process of selectivity, the purchasing agent obtained the item at one-fifth the cost of the original consideration.

EUGENE G. GRACE, honorary board chairman, Bethlehem Steel

E. G. Grace Dies

■ "Mr. Steel" died last week.

And there are thousands who will miss "Gene" Grace, one of the outstanding individualists in the steel industry.

It would be easy to recite key dates, to list all his jobs, and all the innovations which Mr. Grace instituted. But there is far more to it than that.

What counts in the passing of this hard, yet soft, this conservative, yet liberal, this easily understandable, yet hard-to-know man is that he—as a human being—helped to make the steel industry great.

He went from crane operator to the head of Bethlehem Steel Corp., the second largest steel company in the world. True, he made more money than any other modern steel leader. But he earned every job he ever had and every cent he made.

His reputation with the press was at all times the best. No mincer of words and no lover of bores, he had his say; but he listened to others and never failed to answer the questions—no matter what the asker's motive.

Mr. Grace was a hard man, but a fair man. Innovations such as pensions, sick benefits, and employee representation plans appeared in Bethlehem long before they became common in industry.

Probably the greatest single thing Mr. Grace did was to prepare and deliver a terrific personal history of Charles Schwab, his mentor. The first draft, written by ghost writers, went to the wastebasket. What followed was a masterpiece of love, fact, enthusiasm and humility—written and put together from the caustic, short and pungent remarks of "Mr. Steel."

This man will be missed. He was the man of steel—tough, fair and consistent in his love for the industry and steadfast in his strength and leadership to make it not second best, not the best, but **the** industry.

—Tom Campbell.

Second Quarter Profits Plummet

Modest Improvement Expected by Fourth Quarter

Reflecting the steel sales slump, second quarter profits dropped sharply below first quarter levels.

Industry leaders remain moderately optimistic about earnings for the year.

■ Falling sales sharply trimmed steel earnings for the second quarter. And profit prospects for the third quarter are not encouraging. But most steel leaders are optimistic about a modest upturn by the fourth quarter.

Second quarter earnings this year were sharply below those of the same three months in '59. (See table). But, except for a few steelmakers, they were better than the recession-ridden second quarter of 1958. The exceptions included Colorado Fuel & Iron and Kaiser Steel.

Operations Declined—Prime reason for the drop in second quarter '60 profits was the fall-off in orders. As a result, mill shipments ran ahead of new orders and mill backlogs fell. The industry's average operating rate for the April-June period was about 70 pct of capacity, off from an average of about 92 pct in the first quarter.

But second quarter operations were still well above the 54 pct of the same period in '58.

Improvement Expected—Looking beyond the third quarter, steel industry leaders are guardedly optimistic. "Movements in steel operations should be progressively, but modestly better," says U. S. Steel Corp.'s board chairman, Roger M. Blough. Expecting a rise in the fourth quarter to 65 to 75 pct of capacity, he noted consumer inventories "cannot go much lower than they are."

Arthur B. Homer, president of Bethlehem Steel Corp., points out "there are signs our July operating rate will be the low point and we can expect some gradual improvement through the remainder of the year." He adds, "This year isn't going to be so bad, if present indications prove correct."

Joseph L. Block, chairman of Inland Steel Co., expects his company to operate around 60 pct of capacity this month. But, he adds, "It is our confident belief that excessive buyer inventories will soon be liquidated. With the continuance of generally favorable business conditions, steel purchases will steadily improve as the year progresses."

The present quarter should be the low point of '60, Mr. Block predicts, with an improvement in the fourth quarter.

Rising Costs Hurt—Other factors than slow sales added to the deep drop in profits. One was the rising cost of filling orders. With the market depressed, buyers placed more smaller-sized orders at a time when mills had trouble scheduling economic rolling runs. Also cutting into second quarter profits were rising labor costs, and, in some instances, strikes.

How Leaders Fare—Here's how some of the major steelmakers are doing so far in 1960:

U. S. Steel: Earnings for the first half of the year are $193.4 million, contrasted with $254.9 million for first half '59. First half sales are $2.1 billion, compared with $2.5 billion for the first half last year.

Bethlehem: Profits in the first half of '60 are $81.5 million as against $123.1 million for the same period in '59.

Jones & Laughlin: Both sales and earnings for the first half are below 1959. Sales are down from $552.7 million to $461.5 million. Profits dropped from $42.2 million to $26.1 million.

Steel Earnings—1960 versus 1959

COMPANY	Second Quarter 1960	Second Quarter 1959
U. S. Steel	$80,893,489	$148,363,193
Bethlehem	29,714,308	73,591,528
Armco	17,775,225	29,441,030
Jones & Laughlin	8,342,000	26,468,000
Inland Steel	14,323,569	24,313,291
National	9,583,019	22,957,018
Youngstown Sheet & Tube	5,997,762	17,162,941
Colorado Fuel & Iron	432,260*	7,983,920
Wheeling	2,609,000	6,540,000
Crucible	309,345	5,109,855
Pittsburgh Steel	237,617	2,670,903
Granite City	3,316,896	4,885,563
Allegheny Ludlum	741,000	7,819,467
Kaiser Steel	188,264	6,895,020
Detroit Steel	667,858	3,175,354
Alan Wood	350,150	1,141,057
Continental	1,173,228	1,707,426
Washington Steel	392,008	799,366
Eastern Stainless Steel	446,331	950,137

* Indicates loss.

"Shut Down—Moved to Europe—Will Ship to U.S."

Here is a preview of what U. S. metal groups will say when they testify at the end of August:

FERROALLOYS—Ohio Ferro-Alloys Corp.: "The industry is already in peril, and further ferroalloy reductions will certainly put many of the present producers out of business permanently."

Revere Copper and Brass Inc.: "In principle, we dislike tariff barriers as much as anyone else but the alternative is to close our plants and erect a sign, 'Shut Down—Moved to Europe—Will Ship to the U. S.'"

WIRE—Fine and Specialty Wire Manufacturers' Assn.: "Over the past 12 years imports have increased by 150 times, while exports have decreased 10 times. Any further modification of tariff duties would cause or threaten serious injury to the domestic industry."

FORGED FITTINGS AND FLANGES—American Forged Fitting and Flange Assn.: "The present duty on imported fittings and flanges is now at a level at which these products can be imported and sold on the U. S. Market at least 40 pct below the cost of a comparable U. S. produced item."

TOOL AND STAINLESS STEEL—Carpenter Steel Co., representing 14 other companies: "Domestic manufacturers have lost and are now losing much business to importers. The imported steels are displacing domestic steels because they are so cheap."

NICKEL—International Nickel Co.: "The U. S. is necessarily dependent on imports for virtually all of its nickel, a metal which is essential to industry and to defense. The duty imposes a needless and substantial economic burden on U. S. consumers."

Call Comes for Higher Tariffs

U. S. Producers Want Greater Protection

The metal industry will tell the Tariff Commission it wants more protection from foreign competition in hearings next month.

Present standards are dangerous to existing industry, metal men say.—By R. W. Crosby.

■ The U. S. metal industry will be out in full force when its turn comes at the Tariff Commission's "peril-point" hearings, Aug. 25.

The industry, with the exception of some nickel product firms and small aluminum extruders, will argue that foreign metal and metal products tariffs are now at the peril-point and should not be reduced.

Protection Wanted—The line of argument taken by many is that, if anything, tariffs on imports should be raised.

The Tariff Commission hearings are preparation for the U. S.'s part in the negotiations on the General Agreement on Tariffs and Trade (GATT). The U. S. will go to Geneva in September and offer tariff concessions for like cuts in foreign duties.

Summing Up—Perhaps the views of the entire industry were summed up in a statement submitted to the Commission by Hermann K. Intemann, president of Union Carbide Metals Co.

Mr. Intemann urged that present tariff rates on manufactured products be maintained to protect:

The employment of a vast number of workers.

The established, adequate supply of these materials (ferroalloys and metals) to our steel industry.

The funds of a great number of investors in U. S. industries.

And to provide security in the form of essential elements in the military protection of our country.

On the other hand, he recommended that all "raw materials used by the industry for which there is not an ample supply available within our boundaries be admitted at the lowest rate possible."

"For those materials for which there is an adequate source of supply as well as an established mining industry in this country.

There will be many others testifying. Some small aluminum extruders will claim a lowering of the tariff will give them "some relief." The metal building industry will request no increase because of the unemployment in the industry.

U.S. Plants Are on the Rise In Western Europe

By A. W. Barth, Senior Vice President, The Chase Manhattan Bank, New York

Over 400 American companies have set up W. European operations in the past several years.

Here are the types of companies going abroad and the incentives offered them by W. European countries.

▪ In the past two and one-half years, more than 400 American companies have set up new facilities in Western Europe.

Many of these companies have turned a small European operation into a large and important one. Many others have ventured into the European market for the first time.

These range from companies in the metalworking industries (including metals and metal products, machinery, office equipment, instruments and others) to chemical, textile, and petroleum firms. There are even some representatives of the service industries.

Cross Section—Although not a complete list, the table on p. 77, compiled by The Chase Manhattan Bank, shows the broad cross section of American industry now entering Western Europe.

The total amount of the U. S. direct investment in Western Europe has nearly tripled in the past ten years, rising from just over $1.5 billion in 1950 to about $4.5 billion in 1959.

During this entire period, about half the American capital flowing into Western Europe was invested in Great Britain. In the last two years, however, the trend has shifted in favor of the countries of the European Common Market—France, West Germany, Italy and the Benelux nations.

TRADE EXPERT: Alfred W. Barth, administrative head of Chase Manhattan's international department, has long experience in handling foreign trade problems. In 1950 he was awarded the French Legion of Honor for his work as chief negotiator of a $225 million loan to France.

Next Week

Wages and Taxes In the Common Market

Low wage costs and tax incentives are part of the ECM's attraction to American companies going abroad.

Next week's report on the Common Market outlines these advantages along with some pointers on what companies should consider before entering the area.

Mass Market—These countries present the promise of a mass market with a population close to that of the United States, a rapid growth rate, and high sales potential in many products.

As in the rest of Europe, their relatively low labor costs frequently offer a U. S. firm the opportunity to produce at lower cost than is possible at home and to compete more strongly in world markets.

Also, the feeling is widespread that as the six Common Market countries gradually lower tariffs among themselves, while maintaining a common tariff wall against outsiders, the best way to compete in the Common Market is to become a part of it.

All Share—One of the most interesting aspects of the flow of U. S. capital to the Common Market is that all six member-countries are sharing in it. Italy, for example, has always ranked behind her Common Market neighbors in U. S. investment per capita. Recently, however, Italy has been gaining.

In 1958 some $173 million of private foreign capital went into Italy, about half of which came from the United States. The country's large pool of low-cost labor, its rapid rate of industrialization, and special investment incentives in underdeveloped southern Italy have made it attractive to new foreign ventures.

Meanwhile, the other Common Market Countries also have continued to attract U. S. investments.

What They Offer—In France the rich home market, close ties with French overseas markets, skilled labor and rapid industrial growth have always been plus factors for American investment. And the country's recent economic stability, brought about by the financial reforms of 1959, has further enhanced its investment possibilities.

Holland is attracting new U. S. investment for a variety of reasons. Among them are a good geographical location to serve European and overseas markets, an excellent transportation network, and relatively low labor costs.

Belgium, also, has proved attractive. The country has always been strongly oriented toward free enterprise. Like Holland, it is traditionally a trading nation. Belgian labor has a reputation for high productivity—a reputation shared by its neighbor, The Grand Duchy of Luxembourg.

Germany's popularity is founded on a strong and fully convertible currency, advanced technological know-how, established export markets, and a booming domestic market.

Investment Incentives—In many areas of the Common Market, the governments have taken steps to encourage foreign investment. For some American companies that plan to build plants in the Common Market, these "development areas," as they are called, may offer the most fertile field for investment.

These areas basically fall into two categories: Less industrialized agricultural regions; and depressed areas which need new industries to bolster declining employment.

For new U. S. investors, location in these areas offers several significant advantages:

1. American capital is generally most welcome in these areas.

2. Labor and land are more readily available than in the more highly industrialized regions.

3. Foreign investors are offered more in the way of incentives such as tax exemptions, low-cost loans and outright plant subsidies.

Income Per Capita — The less industrialized areas in the Common Market are shown in the map on p. 78. The map shows income per capita for each area, as it compares with the Common Market average.

Regions where per capita income is higher than the average include: the Paris area; the northern and eastern parts of France down to Lyon; the Benelux nations; the Saar, the Ruhr, Hamburg, Bremen, Hesse and West Berlin.

Areas in which per capita income is between 90 pct and 100 pct of the Common Market average include: the southern half of France, northern Italy, and the Rhineland,

U.S. Investment in Common Market, 1958–1960

New Operations by Industry and Country

Industry	Total	COMMON MARKET COUNTRIES					UK	Other
		Belgium	France	Germany	Italy	Holland		
Metalworking								
Machinery	65	9	8	12	7	13	13	3
Electrical Machinery	30	7	2	8	7	2	3	1
Metals and Metal Products	22	5	3	4	5		5	
Transportation Equipment	21	2	5	3	6	3	1	1
Office Machinery	18	1	2	5	1	2	5	2
Instruments	14		1	5	2	5	1	
Research and Engineering	6		1			3	1	1
Nonmetalworking								
Chemicals and Drugs	67	18	11	7	11	12	6	2
Food	17	2	2	3	1	2	6	1
Petroleum	14	3	4	1	4	2		
Rubber	12	1	4	2	2	2	1	
Paper	8	2	2	2	1		1	
Textiles	4	2				2		
Other	29	3	2	8	6	4	3	3
Grand Total	326	55	47	60	53	52	46	14

Source: The Chase Manhattan Bank

Palatinate, Bavaria and lower Saxony in Germany.

Underdeveloped Areas—A less developed group of regions, those where per capita income falls between 40 pct and 90 pct of the average, includes much of the west of France, middle Italy and Schleswig-Holstein in Germany.

The most depressed region is found in the southern Italian mainland, and on the islands of Sicily, Sardinia and Corsica.

To further the economic development of these regions, the European Economic Community has set up the European Investment Bank. Its purpose is to provide an additional source of long-term financing for public and private enterprises.

Offer Subsidies—The major aim of the French development program has been to draw new industry away from the Paris region. Where new industry is wanted, the French government has allowed subsidies averaging about 10 pct of invested capital. In particularly depressed areas it can run as high as 20 pct.

The French government will also arrange part of the financing required by new enterprises.

Incentives offered by the Dutch government to foreign investors include tax-free accelerated depreciation (up to one-third of the original investment) plus a 4 pct annual deduction on plant and equipment. Holland also offers subsidies up to 30 pct of construction costs and 50 pct of land costs in certain agricultural areas.

Tax Exemptions—Belgium has concentrated its efforts on redeveloping its depressed coal mining areas. Capital grants, tax exemptions and low-cost financing (with interest rates as low as 1 pct) are some of the inducements held out by the Belgian government.

The problems of developing southern Italy are so great that the Italian government has created a special agency to handle them.

The incentives offered by this agency include: ten-year exemptions from corporate taxes; grants of up to 20 pct of plant cost; long term financing and direct subsidies which can cover 85 pct of total investment; and reductions in shipping costs and local taxes.

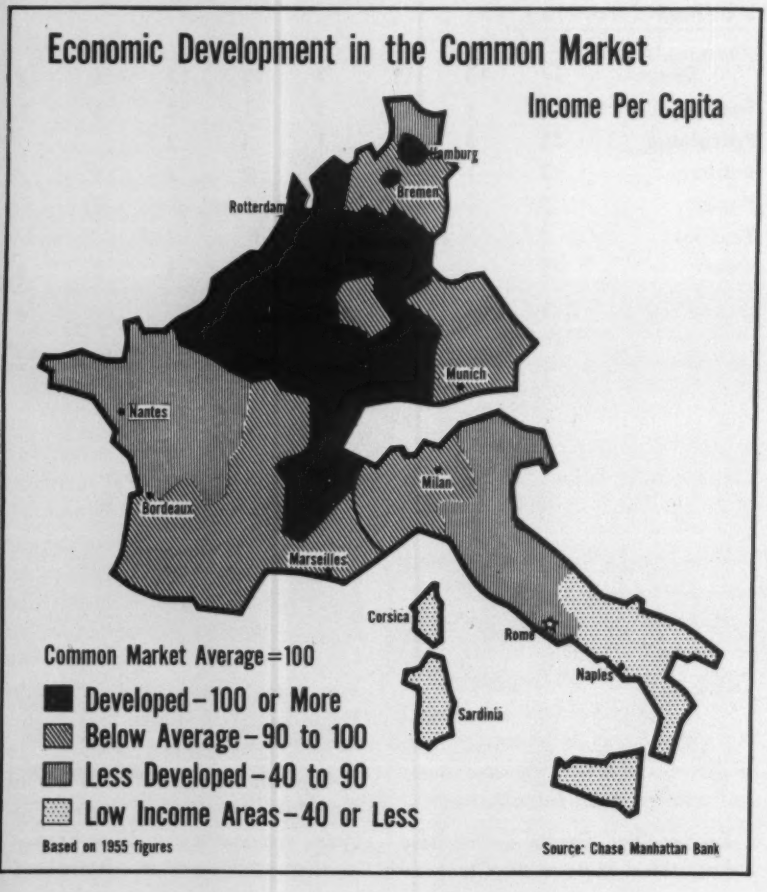
Regional Plans—The West German government does not actively solicit foreign capital to develop its industry. However, there are some regional development programs in the few underdeveloped areas of the country and substantial incentives are also offered to companies locating in West Berlin.

Large British Market—But U. S. investment is not confined to the Common Market. More American investment capital still flows into Great Britain than into any other single country in Europe. This is no surprise considering our common language and similar ways of doing business.

Although not a member of the Common Market, Britain belongs to two other trading blocs: The European Free Trade Association (with Norway, Sweden, Denmark, Austria, Switzerland and Portugal) and the Commonwealth (a market that includes 600 million persons.) Moreover, the British home market is one of the largest in Europe.

Many American companies have moved into Switzerland also. Most of these enterprises have been holding companies and trading companies, set up to take advantage of Switzerland's low tax rates and long experience as a financial center.

Underdeveloped Areas in ECM



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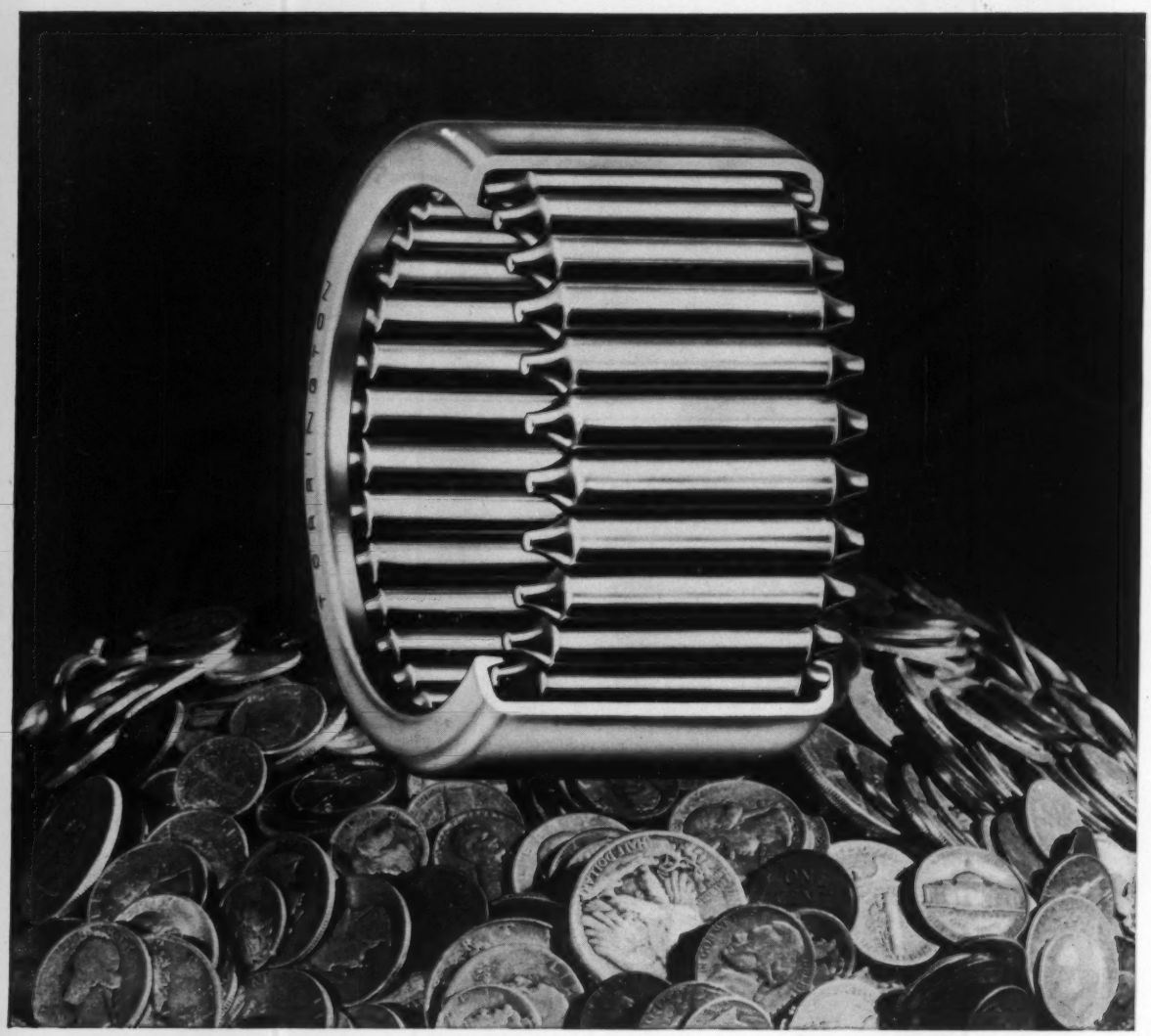

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progress through precision **TORRINGTON BEARINGS**

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U. S. Steel Plans New Blast Furnace

U. S. Steel Corp. has announced plans to build an ultra-modern blast furnace at its Duquesne Works, located just south of Pittsburgh, the furnace will replace older, smaller furnaces in the area.

The furnace is designed to aid in meeting long-range needs for molten iron in the Monongahela Valley. It will incorporate advanced features enabling it to be used in research studies.

The furnace is scheduled for completion in two years. It is expected to produce about 850,000 tons of molten iron annually. Included in the project will be the furnace itself, three hot-blast stoves, a new raw materials trestle and a modern turbo-blower.

The Cost—Officials at U. S. Steel Corp. have not released the cost of the new furnace. Others now in use around the country range in price from $12 million to $26 million.

An existing furnace at the Duquesne Works will be dismantled as the first phase of the construction project. When completed, the newest addition will bear the "No. 6" designation. Also, presently nearing completion at the Pennsylvania location for the corporation are three primary mills for rolling blooms, slabs, and billets.

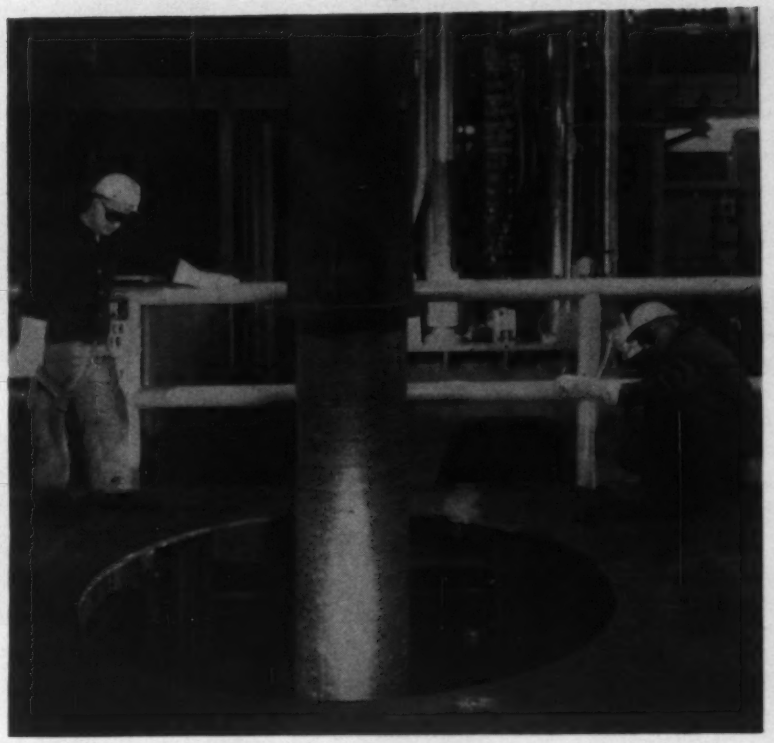
A Bigger Backlog

Arthur G. McKee & Co., Cleveland, O., has landed two new contracts. Work calls for the engineering and construction of two major new iron ore agglomerating facilities.

McKee & Co. will build the pelletizing unit for the 900,000 ton-per-year expansion program at the Republic Mine, in Republic, Mich. The company will also handle a project for U. S. Steel Corp. near Atlantic City, Wyo.

It is reported that these new contracts have increased the company's backlog. An increase has been made from $43 million at the beginning of the year to nearly $60 million now.

Elevator Helps in Stripping Ingot



COMING UP: Workman at right monitors pushbutton control of sunken elevator shaft that makes for easier "stripping" (removal of copper crucible) of 5500 lb consumable electrode melted ingot at the Watervliet, N. Y., Works of Allegheny Ludlum Steel Corp.

Northrop Contracts

The Navy has awarded contracts totaling $28 million to Northrop Corp. The contracts call for the design, development, and production of components for the Polaris fleet ballistic missile system.

Included in the total awards are recent ones for automatic checkout systems, gyroscopes, periscopes and radiometric sextants. Work is being handled at Northrop's Nortronics Division.

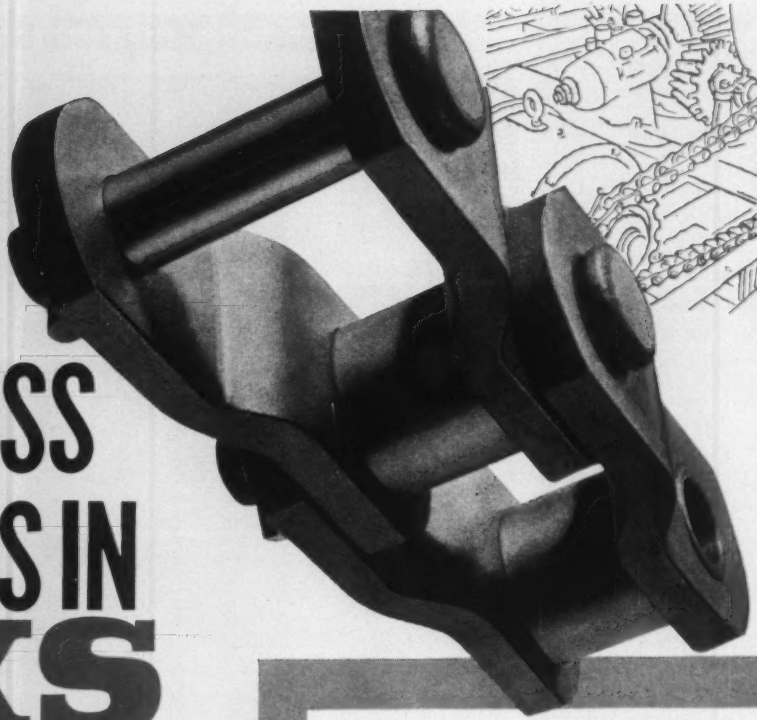
Equipment is being installed on the nation's missile-firing submarines. Engineering and production operations will be conducted in Anaheim, Calif.

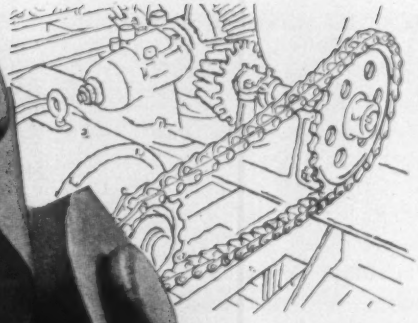
The gyroscopic, radiometric sextant and periscope work is being performed at the company's division in Norwood, Mass. A recent contract award provided for design, development, initial production, and special test equipment for the GI-V6 gyroscope.

Engineers Working

Recent engineering graduates are finding favorable job situations. According to a survey by the Engineering Manpower Commission of Engineers Joint Council, only 7 pct of the grads are looking. The survey says 82 pct immediately went to work. Another 11 pct are considering offers.

Over a period of three years, job commitments for chemical engineers climbed most sharply. Limited data gained in other fields revealed that grads in business and commerce were about 10 pct below engineers in definite commitments.





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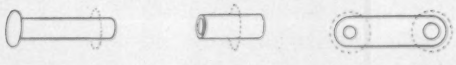

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"FULL-ROUND" design eliminates traditional stress concentration points in Link-Belt LXS . . . provides maximum live bearing area between pins and bushings. Result: stress is distributed evenly.

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How Economic Platforms Differ

With the conventions over, the economic platforms of Republicans and Democrats can now be reviewed.

Here's how each party feels about growth, productivity, money, and taxes.

▪ With the Republican convention over, the economic platforms of the two major parties are now on record.

Other sections of the political platforms, notably civil rights, generated more heat at both conventions. But a close look at the economic views of Democrats and Republicans could be worthwhile.

Here's what the two parties have to say on key issues:

On Growth: Democrats "believe the U. S. economy can and must grow at an average rate of 5 pct annually, almost twice as fast as the average annual rate since 1953. As the first step in speeding economic growth, a Democratic president will put an end to the present high interest, tight money policy . . . a 5 pct growth rate will yield over $40 billion in added revenue in four years at present tax rates."

Republicans point out the U. S. "must quicken the pace of (its) economic growth to meet growing and urgent demands; to sustain our military posture; to provide jobs for a growing labor force in a time of rapid technological change, to improve living standards, and to serve all the needs of an expanding population."

But the GOP adds that "the mainspring of vigorous economic growth lies in the private sector of the economy." And "rejects the concept of artificial growth forced by massive new Federal spending and loose money policies."

On Productivity: Republicans favor "relating wage and other payments to productivity—except when necessary to correct inequities—in order to help the U. S. stay competitive."

Democrats state that "the American consumer has a right to fair prices. . . . A fair share of the gains from increasing productivity in many industries should be passed on to the consumer through price reductions."

On Money and Taxes: Democrats want to "end the present high interest, tight money policy . . . a policy which has failed to keep prices down." They hope to "bring in added Federal tax revenues by expanding the economy itself, closing tax loopholes, and ending waste in Federal spending."

Rejecting loose money policies, the Republicans favor "broadly based tax reform to foster job-making and growth-making investment for modernization and expansion, including realistic incentive depreciation schedules."

Businessmen Still Confident

▪ Businessmen have not lost confidence that 1960 will be a good year.

Many executives are still optimistic about the second half, according to a survey of the National Industrial Conference Board. The NICB recently questioned 210 manufacturers on the outlook for the balance of '60.

Reasons for Hope—Various reasons were given for the optimism. They included: A belief that the economy is basically healthy. A conviction that some of the orders held back in the first half will now be placed. An opinion that inventory cutbacks (especially of primary metal products) are completed and demand will increase. An expectation that new models and new products will stimulate sales in various industries. Among those mentioned were aircraft, instruments, chemicals, and office equipment.

Backward Glance—The majority of those surveyed (63 pct) expect last-half bookings to increase over those of last half 1959. An additional 19 pct believe orders will about equal the final six months of last year. And the rest (18 pct) expect a decline.

Final Demand Rose In Second Quarter

Many business segments took part in a second quarter advance in final demand, the Commerce Dept. reports.

Increases in nondurables and services featured the rise in consumer purchasing. Personal income was an annual rate of $400 billion through June, up 5.5 pct over the same period in '59. A sizeable advance in foreign business boosted the net export rate.

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Dynamill* now brings the work and tool together in the shortest possible time.

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Auto Changeovers Run Smoothly

Plants Undergo Tool, Equipment Alterations

Auto changeovers are now part of a well planned program. Activity lasts from fall to summer.

Plymouth's plans for 1961 actually started three years ago. —By A. E. Fleming.

■ Not long ago new model changeovers consisted of a flurry of activity that kept an auto plant in a whirl for a month or so.

Things are different today. Now changeovers are part of a well planned program that lasts from fall to summer.

A case in point is Plymouth. Its first 1961 car came off the Detroit plant's assembly line early in August. To turn out the first car took 10 days of plant changeover preparations and six months of intense organization.

Plans for the 1961 Plymouth change actually started three years ago. But they weren't finished until last February. Machinery and equipment began moving into the plant about March 1, marking the start of manufacturing preparations.

Important Operations—The 1961 changeover requires a variety of new tools and equipment. Altering fixtures which hold various major assembly sections during production is the most important changeover operation. This involves adapting major assembly fixtures to the new styling.

Once the fixture changes are made, a series of precise checks follows to insure that holding points are in the right location for accurate assembly. Extensive changes are also made to sub-assembly fixtures along with the acquisition of new fixtures.

Hundreds of new tools are made ready for use in the manufacture of the 1961 car. In addition, improvements are made to much of the existing tool equipment. Typical of the tooling changes is replacement of 54 of the 350 gun welders used in building the basic body shell known as the-body-in-white.

Checks and Parts—Entire length of the 12 miles of conveyors in the plant undergo checks. Parts are replaced where needed and other repairs are made in readiness for new model production. The plant's 60 overhead conveyors also receive special maintenance and repair attention. So do all sections of the 1914-ft assembly line.

One of the most "colorful" jobs that takes place during the changeover is the flushing and cleaning of pipes and other equipment in the paint shop in preparation for the

GETTING READY: When an auto plant closes down for the annual model changeover, work doesn't stop. At the Plymouth plant, for example, new tools and fixtures are installed and production line changes are made. It's also the time for a thorough cleaning, including a scrubdown of spray-painting booths.

rainbow of new colors. At the time the plant goes back into production, approximately 7000 gallons of paint are ready to give a satin finish to new cars.

Bulk of the load for getting the plant ready for 1961 production during downtime falls to the more than 250 men who work in relays on an hour - by - hour schedule around the clock, seven days a week.

Stepped Up Work—Among those on hand are 60 highly skilled toolmakers, 36 millwrights, 28 electricians, 26 pipe fitters, 23 carpenters and 80 janitors. In addition, a host of supervisory employes direct changeover activities. Many of those working during model changeover are merely stepping up work on projects they began prior to build-out of the 1960 model.

"Changeover time actually is a matter of maximum concentration of the work that goes on, in some cases, long before the plant stops turning out automobiles," explains K. S. Crawford, Plymouth plant manager. "This year we had the most orderly changeover in the plant history."

He says Plymouth plant management paved the way for the 1961 changeover during the multi-million dollar modernization which set the stage for the change in 1960 to Unibody construction.

Looked Ahead — "In preparing for Unibody construction, we looked ahead to the large-scale changeover we knew we'd face with the 1961 model and took steps then that paid off in an orderly change," Mr. Crawford says.

The first cars to roll off the huge assembly line, almost two months before public introduction, will be used as show cars for displays around the country. Before getting into full production nearly 11 million parts will be stockpiled in the plant. Each new Plymouth will have approximately 6500 separate components to be assembled into a finished automobile.

Automakers Switch to Aluminum Rockers

NEW ROCKER ARM: The young lady holds the newly developed die-cast aluminum rocker arm for use in several 1961 automobiles. Sixteen of the aluminum parts open and close valves 20 times per second in an eight-cylinder auto at turnpike speeds. Arms replace previous cast-iron rockers.

Williams to Test Gas Turbine Engine

A gas turbine engine intended for use in lightweight vehicles will be installed and tested in an Army jeep.

Williams Research Corp., Walled Lake, Mich., has been given a contract for the test by the Detroit Ordnance District. The project is under technical supervision of Ordnance Tank Automotive Command in Detroit.

S. B. Williams, president of the company, says his engine is the smallest gas turbine ever to be tested in any vehicle. It weighs about 50 lb and develops 75 hp. In the jeep it will replace a four-cylinder piston engine, its radiator and cooling system. Altogether, these weigh several hundred pounds more than the gas turbine.

A Definite Need—Mr. Williams says there has been a definite need for exploring the use of gas turbines of all sizes in a variety of vehicle applications.

"Gas turbines are noted for their inherent durability," he declares. "They operate for much longer periods without requiring service; they have the ability to burn a wide variety of fuels, including diesel, and deliver high torque at low vehicle speeds without complex transmissions. They also provide a substantial weight advantage where vehicles must be air transported."

The research engineer, who formerly worked for Chrysler Corp., says his gas turbine has interesting possibilities in the small sports car field. He believes the limited sports car market might open up prior to introduction of gas turbines for general automotive use.

Small and Light—The basic engine is only 10 in. in diameter and 19 in. long, minus accessories and gear. It is smaller and lighter than a marine engine announced last winter, but doesn't have a regenerator and has a high fuel rate.

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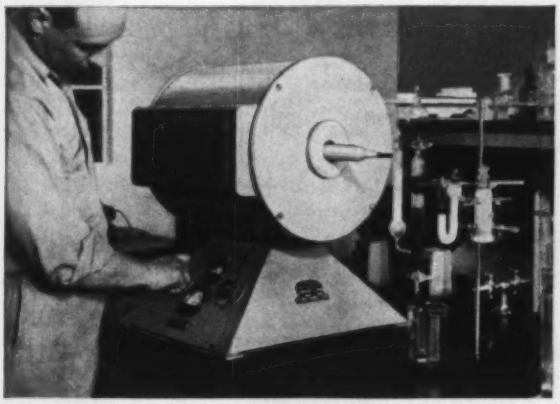
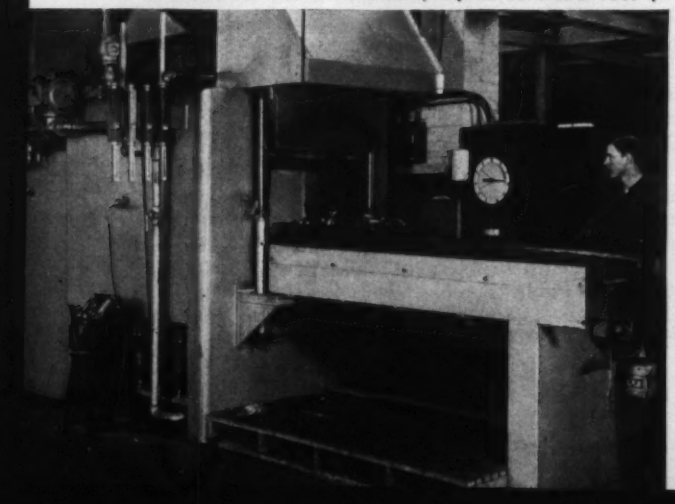


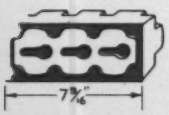
▲ *Merit Corp., Milwaukee, Wis., uses a Hevi-Duty tube furnace to maintain precise temperatures in laboratory quality tests on briquettes used by foundries as an additive to gray iron melts. Two-stage combustion operation on crushed sample burns off free carbon at 1679°F, total carbon at 2471°F.* **For more complete information, please write for Bulletin 254.**

Superior Metal Treating Corp., Muncie, Ind., uses two Hevi-Duty automatic Clean-Line furnaces 24 hours a day, 5 days a week for carburizing, carbonitriding and bright hardening. Temperatures range to 1925°F. The load-transfer mechanism is outside the heating chamber, reducing equipment maintenance. **For more data, request Bulletin D-100.** ▼

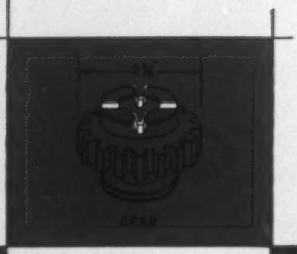


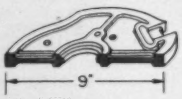
This Hevi-Duty traveling, double-end, box furnace provides ±10°F control at temperatures to 1850°F for bright tempering and stress relieving stainless steel jet engine weldments. This furnace is in continuous operation. User reports brightness improves during process. Unit provides bell-furnace mobility despite lack of head room. **Please write for Bulletin 653.** ▼

CINCINNATI



HEAD-COMPRESSOR





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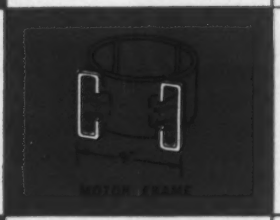
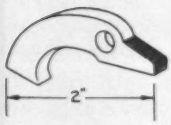
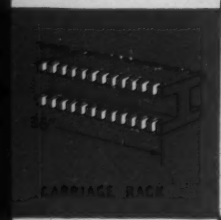
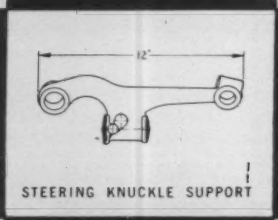


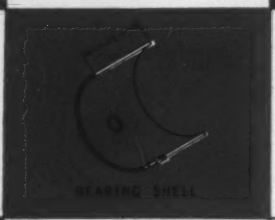


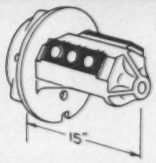
PAWL



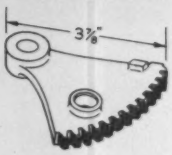


STEERING KNUCKLE SUPPORT





CYLINDER HEAD



GEAR SECTOR

SURFACE BROACHING . . .

Requirements are simple, Possibilities unlimited

Have you thoroughly investigated the possibilities of surface broaching for your cost-reduction program? Surface broaching is faster and more efficient than many other machining methods; it improves accuracy and finish; requires less floor space; lengthens tool life. And its application is broader than you may realize:

- any part which allows cutter teeth to pass across the face of the machined surface, without interference from work or fixture, is logical for surface broaching
- any part produced on a continuous basis, or nearly so, justifies initial tooling costs
- or, on a job lot production basis, families of parts can be broached profitably with interchangeable tooling
- several surfaces can be broached simultaneously, or in one or more settings of the workpiece
- even fragile or light parts can be tooled up to withstand the broaching thrust
- parts which cannot be tooled for broaching often can be redesigned to take advantage of surface broaching's economies

A variety of interesting examples are shown above. Cincinnati Surface Broaching Specialists will be glad to discuss applications in *your* shop. Or write for Publication M-1599-2 . . . "How to Step Up Production with Cincinnati Broaching Machines." SPECIAL MACHINE DIVISION, THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO.

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Battle Cry Sounds in Capital

Congress Could Become a Political Arena

Democratic candidates Kennedy and Johnson plan to use Congress as a campaign stage.

But the President's veto could prove to be a powder-keg for both parties.—By R. W. Crosby.

■ It will be a real slam-bang politicians' session when Congress returns next week.

The Democrats—led by a Kennedy-Johnson coalition — will seek to push through liberal help-the-people legislation.

The Republicans will try to sabotage the Democrat plans. If successful, they will then push for Administration - backed compromises. If they get them through, they'll claim, "We Republicans are the ones who helped the people."

Of course, it's not the people they're after. It's the people's vote.

Lack of Action?—President Eisenhower has already said that he is concerned over Congress' lack of action. Paradoxically, it's not action he really wants—unless it's on his moderate bills.

Coupled with his call for action is the warning that unless the line is held against excess spending, the U. S. is headed for inflation.

Congress will undoubtedly become a political battle ground. Senate majority leader Lyndon B. Johnson and a more powerful Sen. John F. Kennedy will cajole, threaten, or do whatever needed to push through their plans.

The Upper Hand—They have the upper hand. They have the majority on their side and, also, the realization that if they don't get their bills past the President they still win —politically. Ike will veto the too broad bills. But the veto in an election year is a worrisome thing.

The Republicans' main weapon is sabotage. And they won't hesitate to use it.

The place of sabotage is the committee. Before a bill is passed it must go through innumerable committees. They often can be easily bottled up.

This way the Republicans can keep away from the veto and away from a campaign where the Democrats can point to the record.

$600 Million Less

The United States Treasury will pay off $600 million of the national debt by the end of this month.

The debt reduction follows President Eisenhower's announcement that the government finished the 12 months ending June 30 with a surplus of $1.1 billion, five times more than first forecast.

Paying off $600 million doesn't put much of a dent in the $287 billion national debt. But it is an anti-inflationary move, reducing pressure on the nation's money supply.

The debt will be whittled down by paying off in cash $9.6 billion in securities maturing Aug. 15 and then selling only $9 billion in new securities.

A Dark Building Picture?

■ Government's newest construction prediction is misleading. It says that new building expenditures in 1960 will equal the 1959 record year.

The new forecast has been hailed in some spots as a "brighter" building picture than painted earlier this year.

In reality, it's a darker picture.

"It is not a dismal forecast," a Commerce Dept. official said, "but it is not as good as we expected earlier."

Equal Expenditures — The new forecast is that the construction industry, which takes one-fifth to one-fourth of all steel used, will have new building expenditures of $55.8 billion this year, matching last year's record.

However, the original forecast was that new construction would be 2 pct above last year.

Figures, too, can be misleading. If you look at predicted housing starts in the old and new forecasts, you will see figures of 1.2 million starts and 1.36 million starts, respectively.

New Statistical System—That appears to be a 160,000 house jump. But Commerce Dept. officials will tell you that the difference was brought about by a new statistical system of measuring housing starts. The difference is evident in comparing with last year's figures.

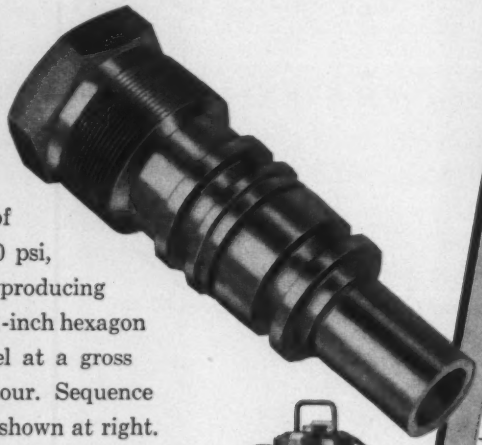
In the old forecast the 1.2 million was compared to 1.34 million starts last year. Now, with the statistical change, the 1.36 million starts is compared with 1.55 million units started last year.

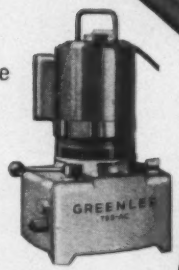
Actually, the government reports, new housing—public and private—will be $2 billion under last year.

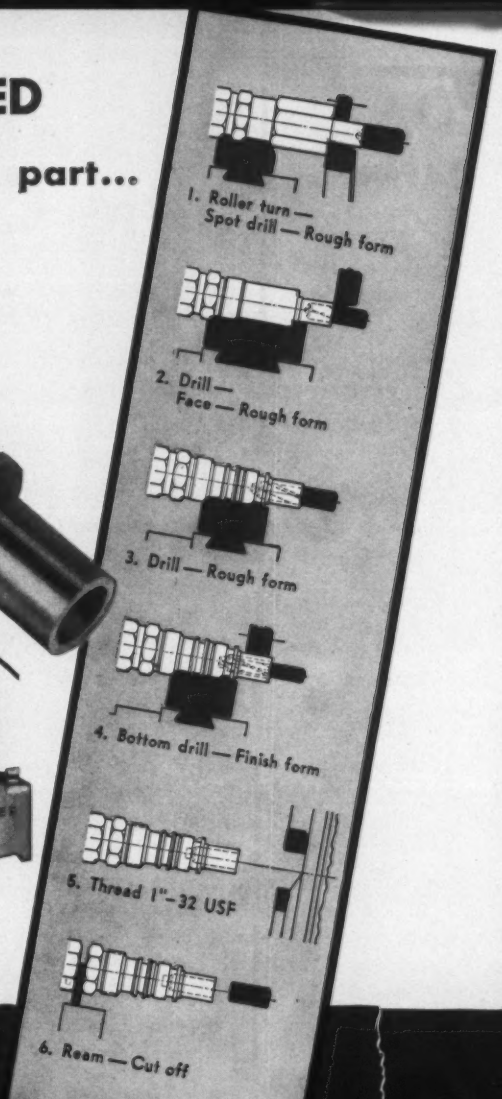
Industry had better be careful in planning construction materials sales. You can't expect 1960 to be another 1959.

GREENLEE AUTOMATICS SPEED PRODUCTION of precision pump part...

The part is the injector cylinder of the Greenlee No. 798 High-Pressure Portable Power Pump manufactured by Greenlee Tool Co., a division of Greenlee Bros. & Co. Since the pump is capable of developing pressures up to 10,000 psi, extreme precision is required in producing the cylinder. It is machined from 1-inch hexagon 4150 chromium-molybdenum steel at a gross production rate of 48 pieces per hour. Sequence of the 13 operations performed is shown at right. Your Greenlee representative will be glad to help solve your precision part problems . . . just send us a print.






1. Roller turn — Spot drill — Rough form
2. Drill — Face — Rough form
3. Drill — Rough form
4. Bottom drill — Finish form
5. Thread 1"–32 USF
6. Ream — Cut off

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Automation Cracks New Field

Atomic Equipment Plants Offer New Market

Automation is starting to make inroads into the atomic equipment manufacturing field.

This should mean a new and rich market for makers of automated equipment. — By R. H. Eshelman.

▪ First wave of automation has hit atomic power equipment plants. Long hampered by blue-sky ideas, small numbers of parts, special materials, high precision and odd configurations, the industry now shows signs of approaching competitive maturity.

Installation of tape-controlled machines in one of the country's major atomic equipment plants is one bench mark. And automated equipment has begun to come into use by suppliers of nuclear components, too. But until this year, when General Electric's atomic power equipment department at San Jose, Calif., started planning widespread automation of facilities, the industry had paid scant attention to such possibilities.

Great Importance — The move should prove important to the whole atomic energy field, by cutting high equipment costs. In the industry, tolerances are often fine as those found in precision watches; components are as large as in steam power plants.

"Atomic power is still not competitive with conventional fueled power plants," notes J. R. Wolcott, GE's manager of atomic equipment manufacturing. "And we need to bring every possible force to bear to make it competitive."

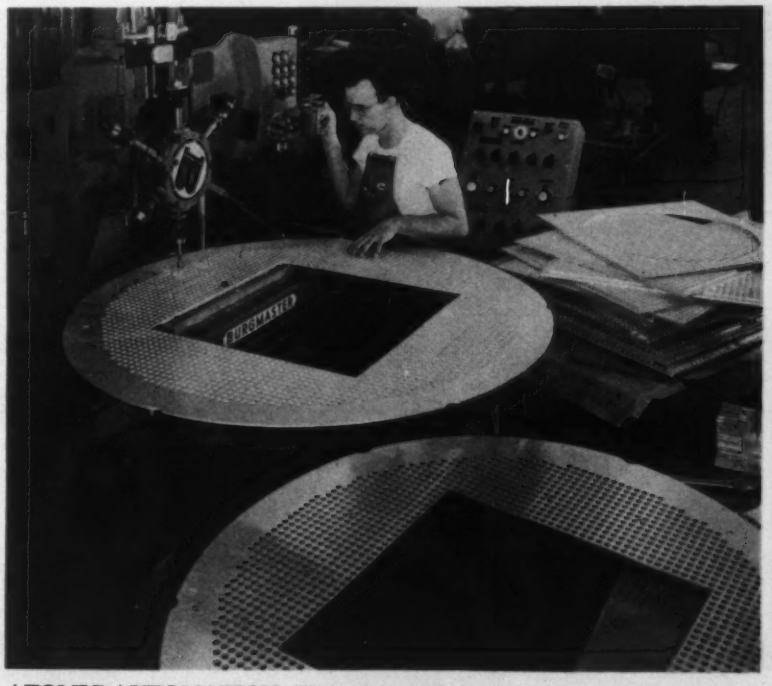
Lucrative Area—If this move triggers the expected chain reaction of modernization, this field could prove one of the most important and lucrative markets for automated machine tools in the new decade.

Placing the San Jose plant on a well-automated basis will take about three years, Mr. Wolcott reports. Expansion of automated facilities will continue as operations grow.

Nuclear electronics manufacturing operations of GE, including the fast-growing nuclear instrument business, are also being automated. Parts lists, inventory control and ordering are now handled by punch card. Office automation—electronic data processing—will also take over materials control work, and be extended to other areas of the plant, the firm announces.

More and Less—"One of the reasons we want to automate now, while we are still growing, is to minimize effect on our employees," says Mr. Wolcott. "Automated machinery increases output per man-hour, and thus reduces manpower requirements."

Experience shows automated equipment, such as the tape-controlled machines on order by GE, requires fewer machine operators, but more salaried personnel for planning and programming. To meet this change, the San Jose division emphasizes training of factory personnel.



ATOMIC AUTOMATION: First of a major modernization program, a GE tape-controlled Burgmaster turret drill finishes 17,200 perfectly spaced holes in a special plate for a nuclear research facility. Machine cut production time on the part from three months to two weeks.

PROOF: B&W Refractories withstand CO and H_2 prepared atmospheres

ATMOSPHERE	APPLICATION	CONSTRUCTION	RESULTS
60% CO	Pusher Type Malleabilizing Furnace	Walls lined with B&W K-23 Insulating Firebrick backed with B&W K-20 IFB. Roof construction—9′-0″ wide sprung arch of B&W K-23 IFB.	No major rebuilding in 21 years.
40% CO	Radiant Tube Annealing Furnaces Malleable Iron Company	Bases lined with 7″ Kaocrete-A, backed with 6″ Kaolite-20. Base size—21′-9¾″ x 9′-9¼″. Temperature 1550 to 1600 F.	In service 11 years. Reducing atmosphere has no effect on the base. All portable annealing furnace bases in plant lined with B&W castables. *Maintenance costs reduced greatly.*
		Bell type covers lined with 9″ B&W K-23 IFB standard shapes in the arch, side and end walls. 13½″ K-23, with Kaowool, is used around the radiant tube openings. Cover is 22′-6″ x 10′-5½″ outside x 8′-4½″ to top of arch.	After approximately 6 years of service, lining showed no disintegration from reducing atmosphere.
65% CO	Radiant Tube Annealing Furnace	Base lined with 5½″ Kaocrete-A and 3½″ Kaolite-20 on top of 5½″ of block insulation. Base size 21′-9″ x 9′-9″. Temperature 1700 F.	Formerly heavy firebrick linings required rebuilding yearly. B&W castable construction has given more than 9 years' service. Customer standardized on B&W castables.
100% N_2 and 100% H_2	Elevator Type Annealing Furnaces Large Steel Co.	Walls lined with 9″ B&W K-23 IFB plus 3″ K-20 IFB. Furnace size 6′-0″ x 16′-0″ x 4′-0″. Temperatures in excess of 2100 F.	B&W refractories show no sign of deterioration in six furnaces of this type in 3 years' operation. Barring mechanical damage, refractories should give long additional service.
100% H_2	Rectangular Hood Type Annealing Furnaces	60 Furnaces, 24 have wall construction consisting of 18″ B&W K-26 IFB plus 2½″ K-1620 IFB. 36 units use wall of 9″ B&W K-26 IFB plus 5″ K-1620 IFB. Furnace size—12′-0″ x 8′-6″. Temperature 2150 F.	Of the 60 covers in service only 2 were rebuilt after 2 years' service. Plant masonry superintendent reports no shrinkage; estimates 15 years' additional life if not for mechanical abuse.

B&W

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Does U.S. Lag in Jetliner Race?

Russians May Be Ahead in Supersonic Transport

U.S. aircraft makers worry that Russians will be first to develop 2000-mph jetliner.

America has needed know-how, they say, but federal funds may be needed to meet development costs.—By R. R. Kay.

■ Will Russia be first in the air with a 2000-mph transport? Will the U. S. lose its lead as supplier to the world's airliners?

Some industry leaders say "yes." And they're mighty worried about it.

Action by USSR—They urge the government and the aerospace industry to get together immediately to develop a Mach 3 transport. Otherwise, the Russians are bound to beat us. Rumors persist that the Soviet Union is well along the way toward building a supersonic transport.

If the Russians are first in the air with one, it will be a great blow to U. S. prestige comparable to the first Sputnik.

Some say "the Russians will have little difficulty in selling the aircraft, perhaps even to our American Flag lines."

. . . And Other Nations—Britain and France are also going after the supersonic transport market. We're completely out of the running.

What to do about it? Move swiftly to start development of a 2000-mph jetliner. First costs might range from $250 million to $1 billion. It's a cinch that the planemakers could not afford such a huge investment.

But the government could lend a financial hand. It's well known that three West Coast companies: Boeing, North American, and Convair, are eyeing this market. Boeing has already spent more than $4 million on preliminary design studies.

U. S. Has Know-How — Aerospace experts agree that the U. S. has all the know-how to build a 2000-mph airliner. And they urge the Federal government and industry to get on the ball.

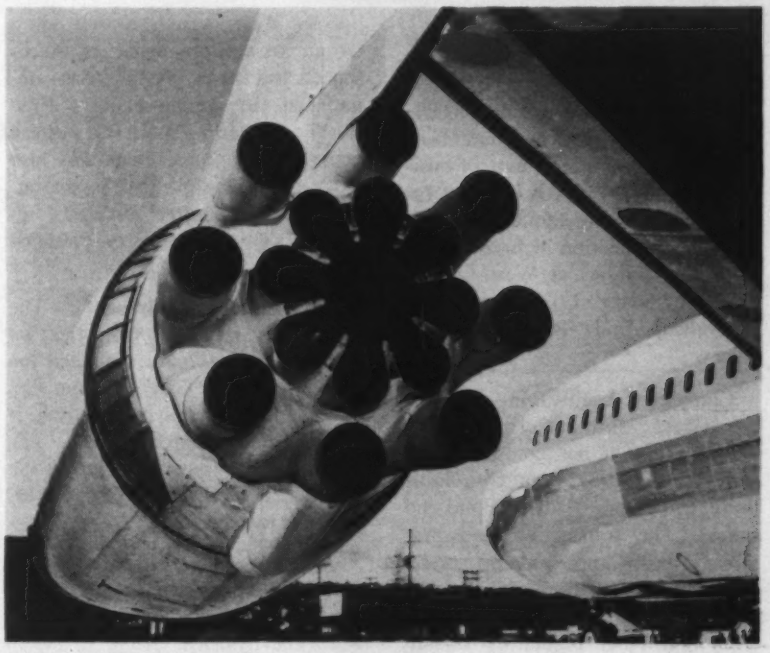
Talking to industry leaders you get a feeling of what could happen if the Russians are first with a supersonic jetliner. This country will probably embark on a crash program to try to regain its lead as supplier to the world's airlines.

Contract for Boeing

Boeing has a $2 million Navy contract for a new anti-submarine patrol boat. It's an experimental subchaser that will use the exotic hydrofoil principle.

The vessel's two 3000-hp gas turbine engines lift the big hull free of the water. Then the subchaser uses its ski-like hydrofoils to glide on the surface at 45 knots. Boeing says its design has a potential for much higher speeds.

Jet Braking System Uses Clamshell Doors



REVERSE THRUST: Behind these cascade vanes on Boeing's 720 jetliner, clamshell doors operate to reverse engine thrust. This provides fast braking action on short landing fields. Bearing assemblies on doors are made from Latrobe Steel Co.'s new GB-41 stainless steel.

INDUSTRIAL BRIEFS

Have Some Coke?—Kaiser Aluminum & Chemical Corp. is building a plant in Gary, Ind., for the primary purpose of calcining petroleum coke. The coke is used in the manufacture of carbon electrodes for the reduction cells in the company's primary aluminum plants. Investment in the plant will total about $1 million.

A New Mill—A new $1 million piercing mill has been installed at the No. 3 tube mill of The Timken Roller Bearing Co.'s Gambrinus steel mill, Canton, O. It replaces a 36-in. piercing mill which is to be reconditioned for use in the No. 4 tube mill being built at the Gambrinus plant. Production capacity of the new mill averages 10,000 tons per month.

U. S. Steel's First—Blaw-Knox Co., Pittsburgh, has a contract for a new six-stand 52-in. cold reduction mill. It will be installed at U. S. Steel's Tennessee Coal & Iron Div. tin mill at Fairfield, Ala. When completed in early 1962, it will be U. S. Steel's first six-stand cold reduction mill for tin plate.

Battery Purchase — The Electric Storage Battery Co. has purchased the nickel-iron alkaline battery business of The Thomas A. Edison Industries division of McGraw-Edison Co. The acquisition includes manufacturing facilities at West Orange and the Silver Lake section of Bloomfield and Belleville, New Jersey.

Completes Acquisition—The International Mining Corp. has announced that it has completed the acquisition of the Canton Co., Baltimore, Md., from Madison Fund and others. The transaction had previously been approved by stockholders of International Mining, the Securities and Exchange Commission, and other regulatory bodies. The purchase, involving $10,380,000, was financed with a bank loan of $3 million and the issuance of 7 pct secured notes for the balance.

Sharp Business — The Marshall Steel Co., LaGrange, Ill., has contracted to sell all of its assets to the Henry G. Thompson & Son Co., New Haven, Conn. The transaction will be closed in the very near future. The Thompson Co. manufactures hack saw and band saw blades.

Beating the Drum—The Delaware Barrel & Drum Co. of Wilmington, Del., has announced that it is entering into a $1 million expansion program. The announcement calls for a completion date of June, 1961. Delaware Barrel has recently purchased the former plant of the Pullman Co. in Wilmington. An additional five acres was also purchased to allow for future expansion.

RASCO Digs—Ground has been officially broken for a new 55,000 sq ft distribution center for Reynolds Aluminum Supply Co. in Atlanta, Ga. The new warehouse will be on a 5-acre plot across the street from RASCO's present Atlanta distribution and manufacturing facilities.

New Asst. Manager—Theodore Grant, western manager of Aerospace Industries Assn., has announced the appointment of Fred A. W. Stiefler as assistant western manager. Announcement was also made of Roland B. Scott's appointment as committee secretary to the association's Industry Planning Committee, western region.

Taylor Buys Equipment — The S. G. Taylor Chain Co., Inc., of Hammond, Ind. has announced the purchase of the Carroll Chain Co. equipment for the manufacturing of weldless and stamped chain. The transaction is aimed at increasing production facilities and better service to customers.

Away We Go—Hughes Aircraft Co. has changed the name of one of its major organizational units from Airborne Systems Group to Aerospace Group. The change, resulting from the company's increasing activities in the space field, affects more than 16,000 employees.

Happy Anniversary — Precision Gears, Inc., has built a new $150,000 building 10 miles west of Milwaukee, Wis. The firm celebrated its 41st anniversary with the recent move to the 16,000 sq ft building.

No Mooing Here—The first major regional material handling and packaging show to be sponsored on the Pacific Coast by the Material Handling Institute, Inc., has been booked into the San Francisco Cow Palace for February, 1961. The Northern California Chapter of American Material Handling Society, Inc., will conduct concurrent educational meetings on show days.

Lots of Ingot — The Refractomet Div., Universal-Cyclops Steel Corp., Bridgeville, Pa., produced one of the largest arc-cast molybdenum ingot. The giant ingot, 17 in. in diameter and 69 in. in length weighed 5000 lb. In January, 1958, Universal-Cyclops made the first 12¾ in. diameter ingot. It weighed 1895 lb. Later that year it cast another ingot weighing 2690 lb.

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Precise light-weight B&D Die Grinders deliver top quality work at high speeds whether shaping, burring or grinding. Handle as easily as a pencil. Vibrationless—perfectly balanced from one end to the other. Smooth operation—perfect for carbide bit use. In sizes #8, #12, #20.

Time saving B&D Portable Grinders go to the work where surfaces must be prepared for welding and finishing. Perfect for smoothing welds, snagging and grinding castings and countless other grinding, cleaning and buffing jobs. 2½″, 5″ and 6″ sizes available.

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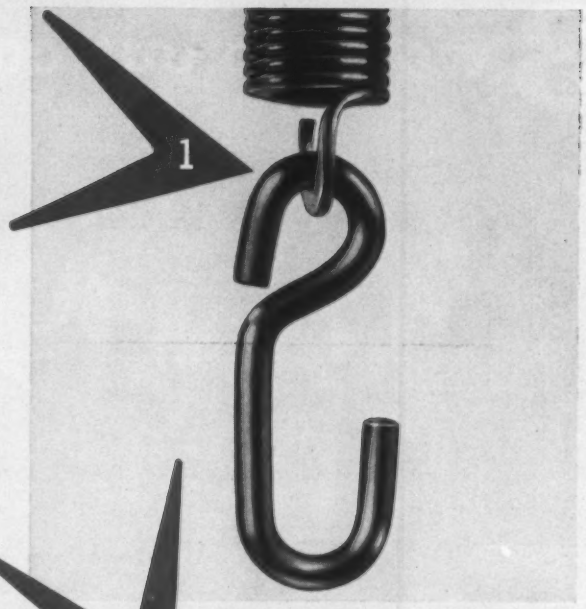
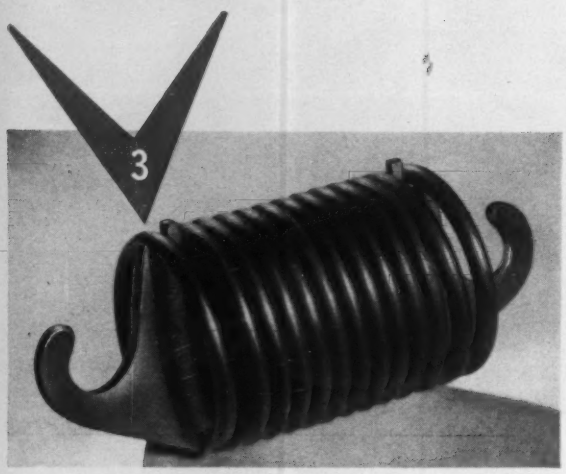
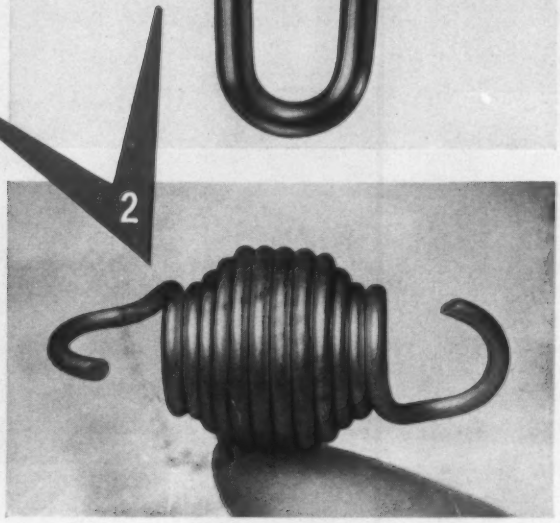
Why it pays to look at the end in the beginning







1. In this pick-arm spring for a textile machine, natural frequency vibration plus rigid end restraint caused early failure. By redesigning spring and adding swivel hook to end assembly, failure was avoided and cost reduced as well.

2. Fatigue failure caused by bending stresses occurs where end hooks join working coils. In this method of reducing the combined stress, two coils at each end are wound with a reduced diameter.

3. Another method for reducing stress concentration where end hooks join coils is to thread a flat stamping into end coils.

Here are a few examples of why it pays to call on the springmaker early in your design problems. End-hook failure of extension springs is a common occurrence that experience can help avoid. Check your specifications for performance and production economy by consulting an A.S.C. spring engineer. Write for bulletin "How to Solve Your Spring Design Problems."

5803

Associated Spring Corporation

General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
B-G-R Division, Plymouth and Ann Arbor, Mich.
Gibson Division, Chicago 14, Ill.
Milwaukee Division, Milwaukee, Wis.
Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
F. N. Manross and Sons Division, Bristol, Conn.
San Francisco Sales Office, Saratoga, Calif.
Seaboard Pacific Division, Gardena, Calif.
Cleveland Sales Office, Cleveland, Ohio
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.

Canadian Subsidiary: Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que. Puerto Rican Subsidiary: Associated Spring of Puerto Rico, Inc., Carolina, P.R.

R. E. Krengel, elected vice president and a member of the board, Ex-Cell-O Corp. of Canada, Ltd., London.

Ohio Gear Co.—**D. D. Brien,** named president. He succeeds **Harrison Browning,** who has been appointed chairman of the board.

U. S. Steel Corp.—**J. W. Kinnear, Jr.,** appointed vice president, Steel Producing Divisions.

U. S. Steel Corp., Tennessee Coal & Iron Div.—**Oscar Pearson,** appointed executive vice president.

Acoustica Associates, Inc. — **F. P. DeLuca, Jr.,** named president of the corporation and its subsidiaries. He succeeds **R. L. Rod,** who will be chairman of the board.

Kaiser Industries Corp.—**George Havas,** appointed vice president and director of engineering.

United States Pipe & Foundry Co.—**R. E. Garrett,** elected president and chief executive officer. He succeeds **C. S. Lawson,** who retires but will continue as chairman of the board of directors.

Michigan Abrasive Co. — **F. P. Hauck,** elected executive vice president and **R. C. Dickey,** as vice president, manufacturing; **W. S. Hoskin,** named vice president, sales and **K. C. Davis,** promoted to general sales manager.

Western Precipitation Div., Joy Manufacturing Co. — **P. W. Zilliacus,** named general sales manager.

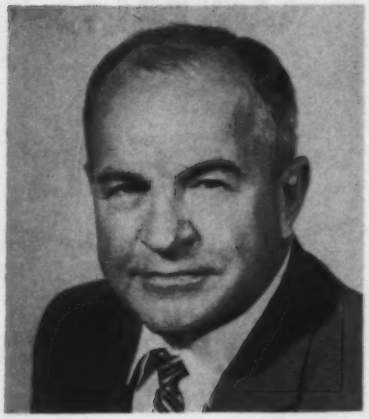
Republic Steel Corp. — **R. D. Smith,** appointed asst. treasurer.

Alemite Div., Stewart - Warner Corp. — **M. W. Piehl,** appointed sales manager, Marketing Division.

Luria Bros. & Co. Inc.—**D. F. Fahrendorf,** named St. Louis district manager.

The Thompson - Ramo - Wooldridge Products Co.—**W. S. Aiken,** named director, engineering.

Kaiser Aluminum & Chemical Sales, Inc.—**E. T. McBirney,** appointed eastern regional manager, consumer foil.



A. K. Blough, appointed chairman, openhearth and electric furnace committees, Republic Steel Corp.

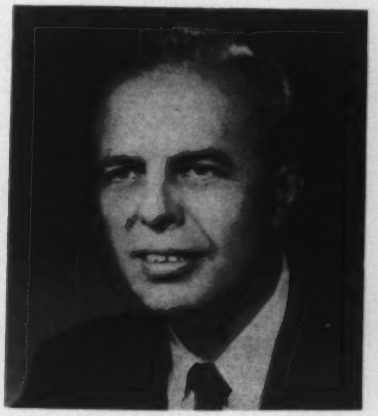
The Hoefer Manufacturing Co.—**E. A. Timm,** elected vice president.

Armco Steel Corp., Armco Div. —**W. I. Norman,** named manager, Zanesville, O., Works.

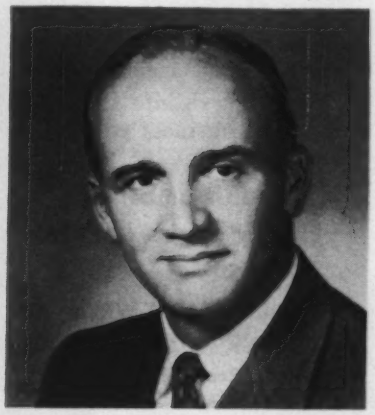
Republic Steel Corp. — **J. J. Wyandt,** appointed superintendent, Openhearth Dept. and No. 2 and 3 electric furnace shops, Central Alloy District steel plant, Canton, O.; **J. P. Rebillot,** appointed asst. su-

(Continued on P. 98)

A. L. West, appointed vice president, operations, Fairbanks, Morse & Co.



R. J. Weesner, named vice president, sales and engineering, The Imperial Electric Co., Akron, O.



S. J. Gillen, appointed general manager, Steel Div., Ford Motor Co.

MAKE CONTACTS FOR CONTRACTS

THE NORTHEASTERN STATES EXPOSITION OF INDUSTRIAL PROGRESS

An Exhibit of Business Opportunities August 23, 24 and 25, 1960
South Portland, Maine

●

HERE IS A MATCHLESS OPPORTUNITY FOR MANUFACTURERS TO SHOW PRODUCTS AND CAPABILITIES TO

- FEDERAL PROCUREMENT OFFICIALS
- PRIME CONTRACTORS
- SUBCONTRACTORS
- OTHER PRIVATE INDUSTRY MANAGEMENT

The EXPOSITION is co-sponsored by the twelve Northeast states in cooperation with the U. S. Dept. of Defense and other Federal agencies.

Similar exhibits have had excellent business results for participants.

Exhibit or attend.
Exhibit space is FREE.

●

FOR DETAILS WRITE:

Lloyd K. Allen, Commissioner
Dept. of Economic Development
State Capitol, Augusta, Maine
(MAyfair 3-4511—Ext. 571)

(Continued from P. 97)

perintendent, Openhearth Dept. and No. 2 and 3 electric furnace shops.

A. M. Byers Co.—**A. N. Voripaieff,** appointed New York Division manager.

Alloy Tube Div., The Carpenter Steel Co.—**J. T. Lurcott,** appointed territorial sales manager, Metropolitan New York area.

Consolidated Electrodynamics Corp.—**R. W. John,** elected asst. secretary.

International Div., The Cooper-Bessemer Corp.—**D. A. Harnsberger,** named technical coordinator.

C. A. Roberts Co.—**R. N. Gibson,** appointed sales manager, Chicago district.

The Garrett Corp., AiResearch Manufacturing Div.—**R. E. Palmer,** appointed manager, Los Angeles.

I-T-E Circuit Breaker Co.—**A. G. Curtin,** named manager, construction marketing.

The Cooper - Bessemer Corp.—**C. L. McDougall,** appointed asst. parts sales manager.

Orr & Sembower, Inc.—**R. W. Lamp,** appointed manager, production.

The Falk Corp.—**F. H. Frandsen,** appointed manager, Denver district office.

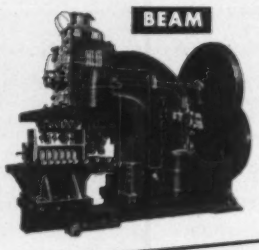
Cleveland Graphite Bronze Div., Clevite Corp.—**J. J. McKinnie,** appointed Detroit district sales manager.

The Cooper-Bessemer Corp.—**H. B. Cox, Jr.,** appointed sales engineer, Houston branch office; **O. W. Stanley,** named branch manager, Odessa, Texas, branch office.

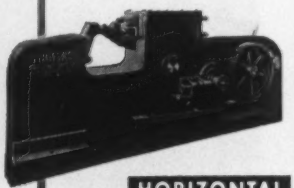
National Can Corp.—**I. M. Long,** named manager, Baltimore, Md.,

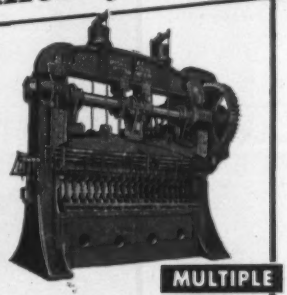
(Continued on P. 102)

The trend is to THOMAS



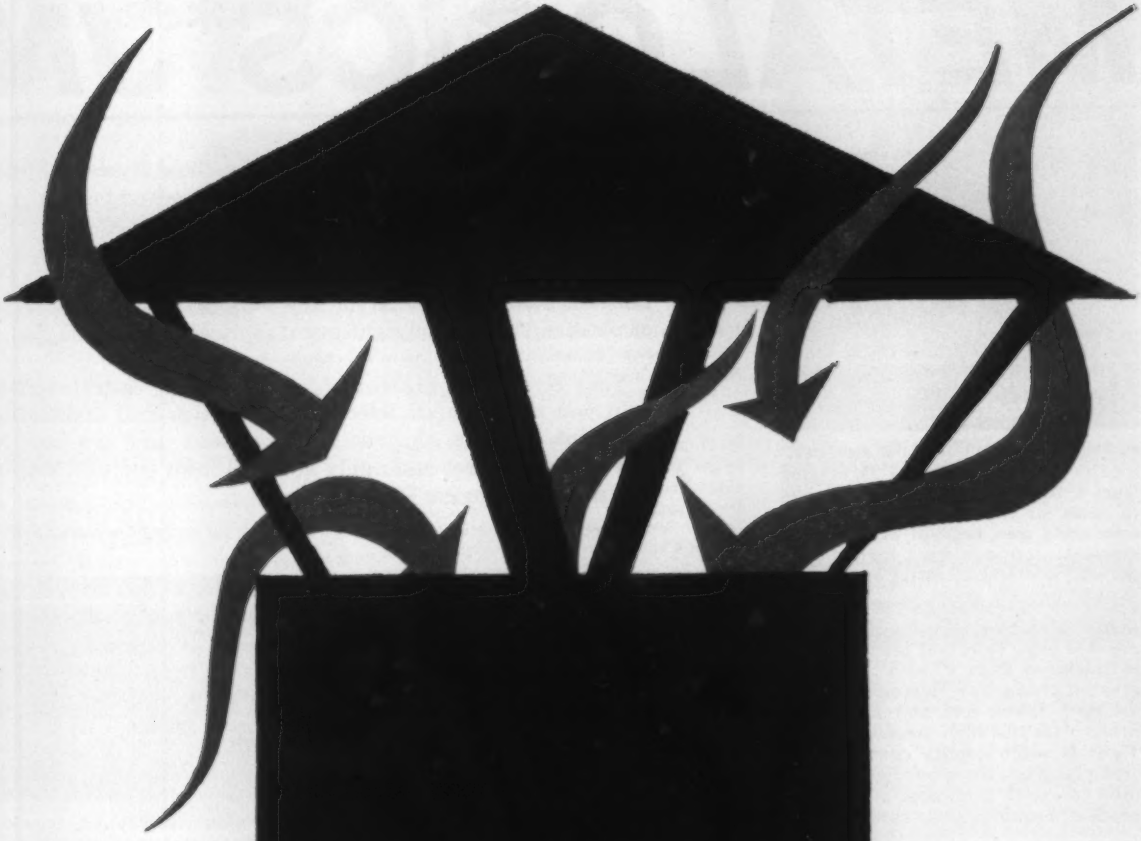
THOMAS has the punch you need





A wide range of capacities for any punching need
Send for bulletin on type you require
SHEARS • PRESSES • BENDERS • SPACING TABLES

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 33, PA.



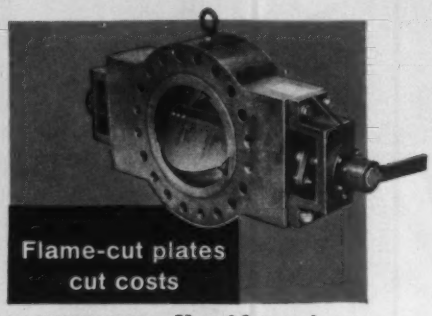
Does the air in your stacks go down?

It can happen, you know. The problem is lack of make-up air to balance fume, dust, and ventilation exhaust. This causes a partial vacuum. Without a planned make-up air system, you suffer from ineffective exhaust fans, air-starved combustion processes, uncomfortable workers. To you, this means costly inefficient operation . . . and worker absenteeism. ● Westinghouse has a unique group of air application engineers, experts in balanced industrial ventilation. Why not call them in? ● Sturtevant Division, Boston 36, Massachusetts

YOU CAN BE SURE . . . IF IT'S Westinghouse

J80705

METALOGICS* IN



Flame-cut plates cut costs

HIGH REJECTS: Use of flat steel castings for valve bodies, with I. D. ranging from 4" to 60", accounted for increases in costs for this manufacturer. Pattern costs rose because of numerous changes . . . rejects were high due to porosity and other casting faults that showed up only after machining.

HIGH QUALITY: Ryerson recommended using flame-cut plates ranging in thickness from 1" to 8". Results: greater production flexibility, faster delivery, lower cost and a stronger product for this high-pressure service. Tight Ryerson quality control delivered plates of exceptionally clean surface to exact thickness of finished product, requiring little machining.

Machine cut rings solve problem

PLATES REQUESTED: Ryerson was asked to bid on supplying ¼" Type 410 stainless in 27½" square plates. Material was to be used for orifice plates for 16" burner, subjected to elevated temperatures.

RINGS RECOMMENDED: Going beyond material specs, the Ryerson representative found that the customer intended to cut plate into 27⅛"-diameter rings with 13.120" bore—and then mill 12 slots in outer diameter for expansion relief. Knowing the application, Ryerson recommended supplying machine-cut rings in which slots could then be punched rather than milled. Production savings enabled switching to Type 304 at less cost than Type 410 with slots milled.

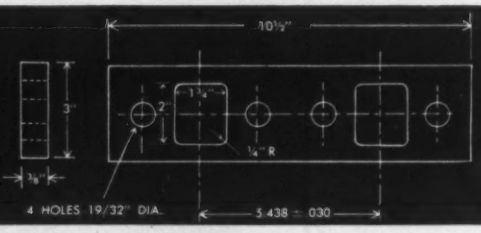
Look at these random examples and see how Ryerson Metalogics sparks real savings by continually searching for and suggesting new materials, methods and techniques.

The broadest experience anywhere combines with the widest range of stocks available to offer you unbiased recommendations on the best material for any job—be it steel, aluminum or plastics. Always the right metal-fabricating machine, too—for Ryerson is the nation's largest distributor.

Your Ryerson representative is "Metalogics-trained" to help you *value-analyze* selection, fabrication and application problems. Get his constructive ideas soon, and see how he can help you select and apply material from our vast stocks. It's the "Metalogical" thing to do.

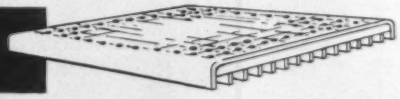
**The Ryerson science of giving optimum value for every purchasing dollar.*

Saved: $100 per thousand



PROBLEM: Muffler manufacturer required accurately finished mounting plates made from ⅜" x 3" bar. Cutting bars to size, burning 1¾" x 2" holes and drilling four 19/32" holes proved time-consuming and expensive.
SOLUTION: Ryerson recommended that they eliminate cutting, burning and drilling operations by stamping the part from Ryerson forming-quality plate. One operation instead of three cut costs $100.00 per thousand pieces and quickly justified the small initial investment in dies.

Suggestion saves 85%



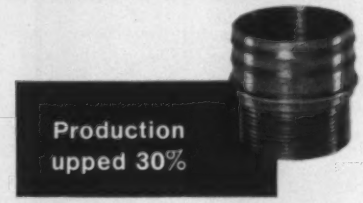
ASKED FOR: Customer wanted 1" hot rolled plate to cover about 80' of 24" open trench. Plate was to be cut into 24" x 27" segments—each containing 900 ⅛" holes to filter the product.
RECOMMENDED: After studying application and cost, Ryerson recommended a design combining perforated light plate, formed to channel shape, and grating for structural support. Ryerson experience and imagination saved 85% of the original cost.

Soft touch on fabricating sheets

THE NEED: Cold rolled sheets that would take severe forming and retain smooth, dull surface for high lacquer finish. Sheet quality was found on inspection to vary widely from one shipment to the next, causing variations in forming and finishing operations . . . high reject rate.

THE ANSWER: The Ryerson representative showed how our stringent quality controls would assure consistent quality on every shipment so that forming and finishing could be standardized for better results . . . lower production cost figures.

ACTION



BEFORE: Job shop was using MT 1015 tubing in the manufacture of this coupling. Machinability was satisfactory, but rising costs of operation led to a search for ways to economize.

AFTER: Careful study by the Ryerson representative brought about a change in material. He recommended using Ledloy® 170 tubing, which increased machining speed to 170 s.f.m. and stepped up production 30%. Ryerson's stocks include the widest range of fast machining alloys—types and sizes to fit your every need.

OLD WAY: A screw machine shop used nylon in the manufacture of nipple adapter and coupling nuts—until a Ryerson representative came on the scene.

NEW WAY: At his suggestion, they changed to Ryertex-Omicron PVC—cut costs 50%. PVC machined better—to closer tolerances, with improved finish . . . ran faster without "gumming." Note exact cutting of threads and barbs. Threads fit perfectly.

5-DAY LIFE: The sheaves that guide the enormous digging buckets of underwater dredges take a very severe load. Bronze bearing in the sheaves had to be replaced every four or five days.

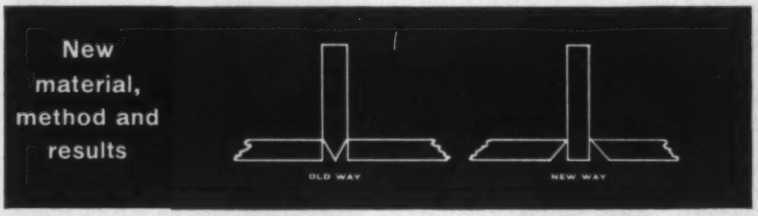
5 MONTHS, SO FAR: After discussing the problem with a Ryerson man, the chief engineer decided to try a bearing made of Ryertex. The change was made, and five months later hardly any wear was noticeable! With its low friction coefficient, Ryertex is nonbinding, even on itself.

SEARCH: Complicated machining of a carbide grade gear shaft included cuts up to ½". It was discovered that required machining was too slow with the steel chosen for the job.

ANSWER: Rycut® 40 was recommended by the Ryerson representative. This free machining alloy fit the situation perfectly. The company found that Rycut 40 machined at 250 s.f.m., gave a better finish, increased tool life, and lowered total per-piece cost. An alloy in the Rycut series may well lower your costs.

2 metalworking machines for the price of 1

A fabricator of stainless steel kitchen equipment was recently in the market for a new squaring shear. The one under consideration had a gap-type frame which would enable him to do an important notching operation—necessary for certain sink tops. After careful study, a Ryerson machinery specialist recommended *two* pieces of equipment instead of one at no increase in total cost. The first, an underdriven shear. The second, a universal-type sheet metalworking machine that would do the required notching, plus many other jobs—adding versatility to the entire operation.



OLD: Rows of vertical aluminum grid members were attached to an aluminum base plate by notching the grid members and welding. (2024-T3 aluminum plate was used.) However, upon cooling, welds fractured—causing a high reject rate on this assembly.

NEW: A Ryerson representative suggested undercutting the base plate (as shown) instead of the grid members. This exposed a greater area to heat and permitted a larger deposit of weld material. Another Ryerson suggestion: change material to 5052-H34 aluminum, which responds better to welding operations.

PRODUCTS IN STOCK

STEEL—carbon, alloy, and stainless steel—bars, structurals, plates, sheets and strip, tubing, etc.

ALUMINUM—sheet (including new building sheet), plate, coils, rod and bar, tubing and pipe, building products, etc.

INDUSTRIAL PLASTICS—Ryertex-Omicron PVC in all forms. Also Ryertex® laminated phenolic plastics for bearings.

METALWORKING MACHINERY—the broadest line available from a single source for every kind of metal fabrication. Also specialized line of material handling equipment.

METALOGICS
RYERSON PLUS VALUE

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

PLANT SERVICE CENTERS: BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • HOUSTON • INDIANAPOLIS
LOS ANGELES • MILWAUKEE • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • SPOKANE • WALLINGFORD

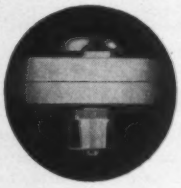
Townsend Lockbolts now available in Stainless Steel for greater strength ...corrosion resistance

If you need extra strength in fastening your assembly—plus corrosion resistance—you can get both now with Townsend 18-8 stainless steel lockbolts.

The use of Townsend stainless lockbolts gives you greater flexibility of design and the values are highly uniform. There is no chance for human error in setting lockbolts. Men with no special training get strong, vibration-proof joints every time.

Townsend stainless lockbolts are vastly easier to install —for example, they eliminate the back breaking work of bucking stainless rivets which work-harden rapidly.

Townsend lockbolts are also available in carbon steel and aluminum alloy in a wide range of diameters and grip lengths in brazier, button and 90° countersunk head styles. Write today for information to Engineered Fasteners Division, P.O. Box 71-B, Ellwood City, Pennsylvania.



Licensed under Huck patents RE 22,792; 2,114,493; 2,527,307; 2,531,048; 2,531,049 and 2,754,703

Townsend Company

ESTABLISHED 1816

Engineered Fasteners Division

ELLWOOD CITY • PENNSYLVANIA

Cherry Rivet Division • Santa Ana, California

(Continued from P. 98)

plant. He succeeds **L. D. McEvoy,** who becomes supervisor, training, Atlantic Div.

Marshall Schober, named asst. to the president, Latrobe Steel Co., Latrobe, Pa.

Ford Motor Co., Steel Div.—**C. W. Conn,** appointed asst. general manager.

Republic Steel Corp. — **W. R. Meyer,** appointed asst. district sales manager, St. Louis district.

W. L. Hanson, named general superintendent, Ivanhoe Div., The Reliance Electric & Engineering Co.

Scientific and Process Instruments Div., Beckman Instruments, Inc. — **R. L. Solnick,** appointed chief project engineer.

Disston Div., H. K. Porter Co., Inc.—**Charles E. K. Fox,** named

plant manager, Danville (Virginia) Works.

Roland Hecker, named chief engineer, Burg Tool Mfg. Co., Inc., Gardena, Calif.

E. E. Smith, appointed general sales manager, Climax Molybdenum Co.

Stromberg Carlson's Electronic Div.—**P. J. Tapernoux,** appointed system design manager, Systems Management Dept.

U. S. Steel Corp., Steel Producing Divisions — **J. E. Angle,** appointed administrative vice president.

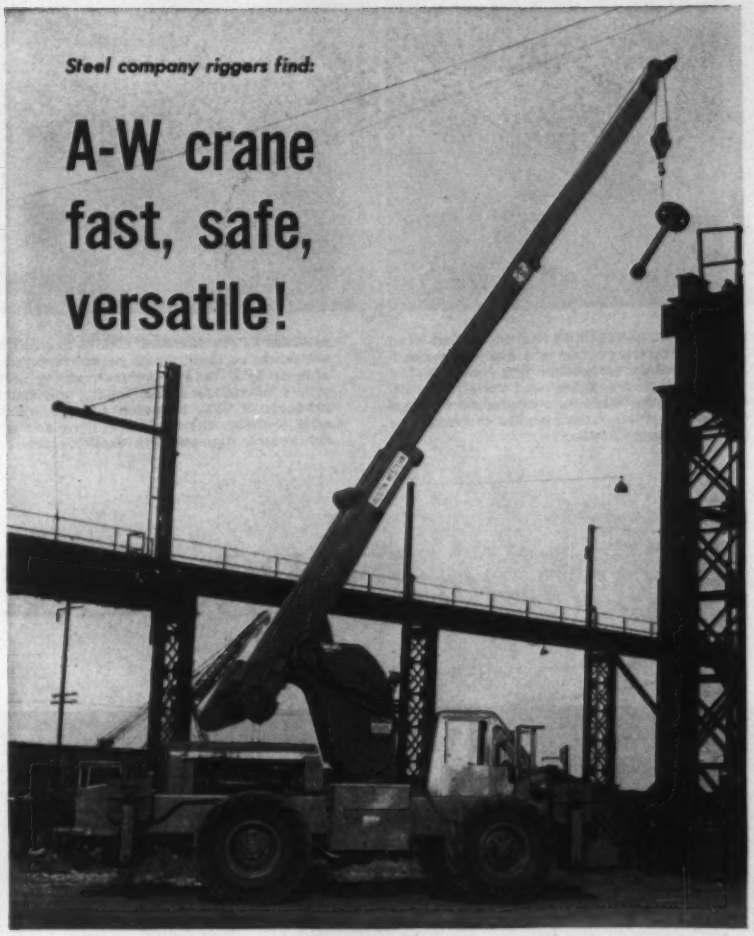
OBITUARIES

H. T. Chandler, 69, former vice president, Vanadium Corp. of America.

Edmund Foley, retired superintendent, Rust Furnace Co., Pittsburgh.

Steel company riggers find:

A-W crane fast, safe, versatile!



Telescoping boom of A-W crane removes damaged gear from overhead crane.

Riggers at Columbia-Geneva Steel Division of United States Steel Corporation, have an Austin-Western Model 210 hydraulic crane to work for them.

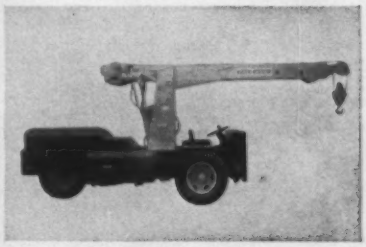
A precision unit

They have found it a good, fast, safe piece of equipment. It is used primarily for such maintenance work as repairing overhead cranes, installing water pumps, and erecting steel. More and more uses are found for it daily, often for materials handling. It is particularly useful for any work that requires precision lifting, carrying or placement. U.S. Steel also has an A-W at its Fairless Works, in eastern Pennsylvania.

Available in five models; capacities range from 5 to 11 tons. Most feature all-wheel drive, all-wheel steering, continuous full circle boom rotation, telescoping boom, and hydraulic controls. Optional features available.

Complete line

Why not investigate this complete line of lift, carry and place equipment. For facts and figures, or a demonstration, contact your nearby Austin-Western distributor or write us.



New Model 110—5-ton capacity range. 220° boom swing without cab. Dual front driving wheels; dual rear trunnion steering.

Austin-Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

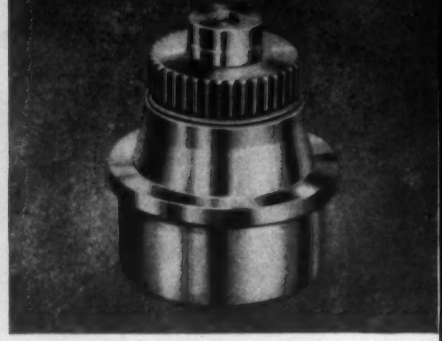
UNBRAKO

INDUSTRIAL FASTENERS like this Socket Head Cap Screw are produced to a dynamic reliability standard as a result of SPS research. The SPS line includes a limitless variety of self-locking screws, locknuts and precision fasteners for everything from massive machinery to the most minute products.

SPS AIRCRAFT

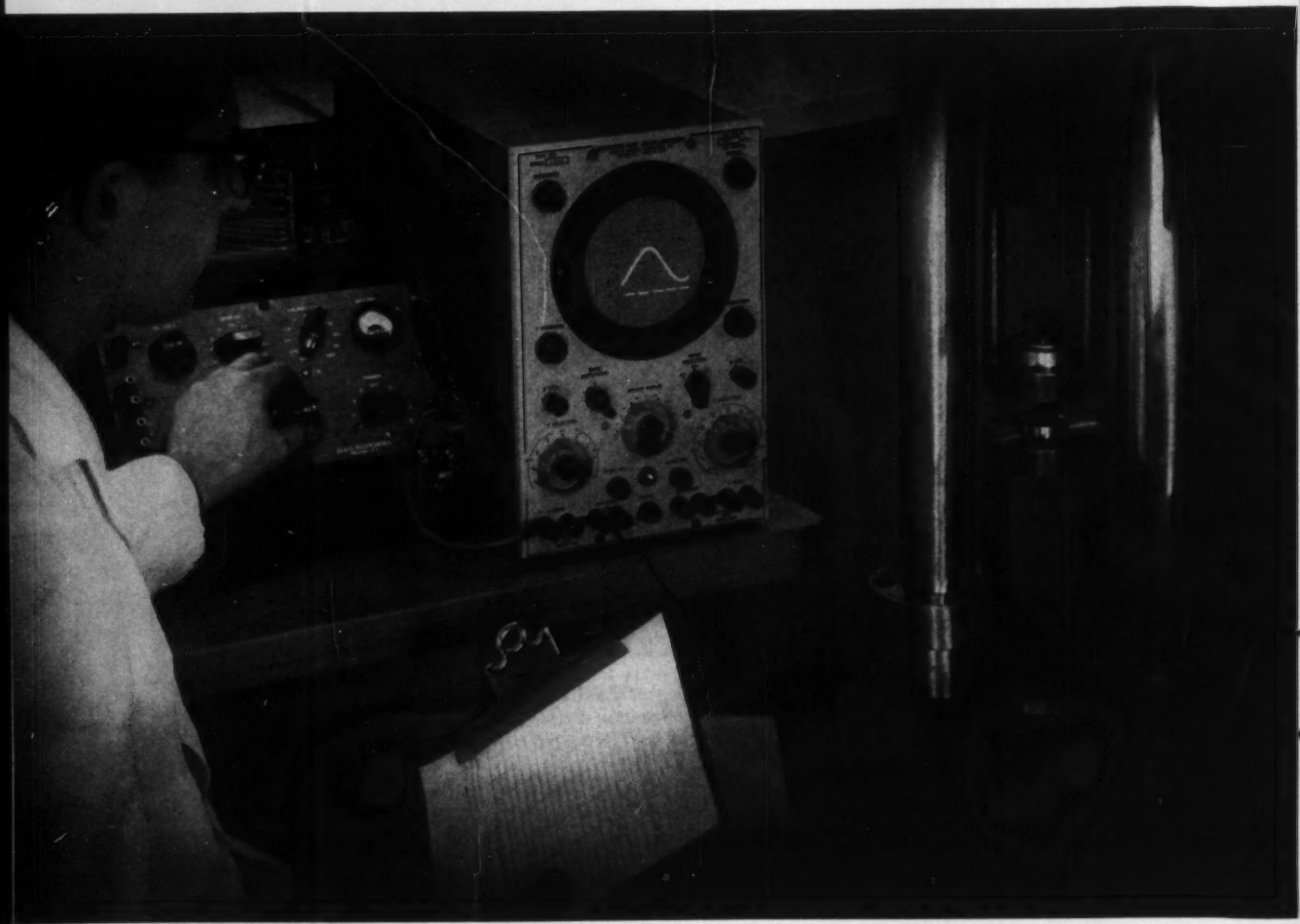
AIRCRAFT/MISSILE FASTENERS like this bolt are produced to ultra-high performance standards at SPS. Today's lightest, strongest fasteners in standard and special designs are products of SPS. Research and development work includes titanium, beryllium and other lightweight, high-strength exotic metals.

SPS NUCLEAR



NUCLEAR COMPONENTS like this cap for a core housing are held to almost unbelievable dimensional tolerances. The nuclear energy field depends on SPS for threaded fasteners, control rod drive mechanisms, motor tubes, core components, instrumentation housings and many other essential parts.

SPS research doubles



Oscilloscope registers load applied to UNBRAKO *Socket Cap Screw during fatigue test. Results prove new Hi-Life thread and pHd head design have doubled fatigue life of* UNBRAKO *Socket Screws.*

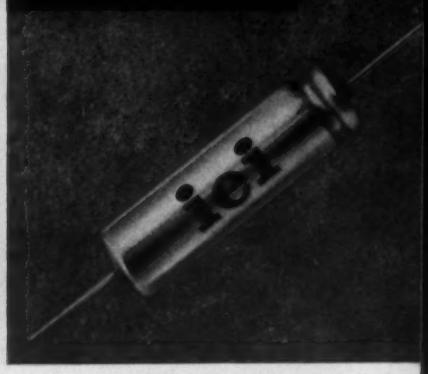
HALLOWELL

SHOP EQUIPMENT for industry and schools is made to the same superior quality standards as other SPS products. The Hallowell line offers broad coverage of standard and special needs in work benches, shelving, and similar equipment. Ruggedness and space efficiency are well identified with Hallowell.

COLUMBIA

OFFICE FURNITURE like this handsome Columbia Nine-to-Five unit sets an office apart with distinctive styling and color combinations. The complete line includes efficiently designed, durable steel office furniture, plus special units, a wide choice of smart chairs, filing cabinets and accessories.

I. E. I.



CAPACITORS FOR ELECTRONICS bearing the IEI trademark are widely used for subminiature circuitry and transistorized applications. This SPS company makes both aluminum and tantalum capacitors, including the lightest and smallest per given capacitance in the industry, to the highest quality standards.

"breathing" life of socket screws

A fastener is almost constantly in motion. Sometimes minutely . . . but often stretching and flexing violently under varying stress loads.

This "breathing" . . . you probably know it better as fatigue, is the killer that tires the metal in a fastener until it breaks. The period from installation to fatigue failure is fatigue life.

Two major developments in the SPS laboratory for advanced fastener research have now *doubled* fatigue life of UNBRAKO Socket Head Cap Screws.

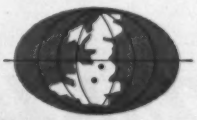
First is in the thread . . . where 85% of all screw failures occur. Research proved the flat root in an ordinary thread form invited fatigue cracks at its sharp corners. SPS eliminated this danger with the smooth, wide root radius now exclusively on UNBRAKO Hi-Life Socket Screws.

Second is in the head . . . where research has added 233% more load-carrying capacity. Proper head design (pHd) in the 1960 series incorporates a larger head for more bearing area . . . a more generous head-to-shank fillet . . . and an enlarged socket area for better wrenching and higher tightening torques.

Together these advanced developments add up to the highest reliability you can get in any socket screw today. Write for literature.

SPS

where reliability replaces probability



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Improve product quality and get more footage out of every roll — specify Midvac Rolls on your mills. Midvale-Heppenstall also makes forged rolls for rolling steel and non-ferrous metals, paper, plastics and rubber.

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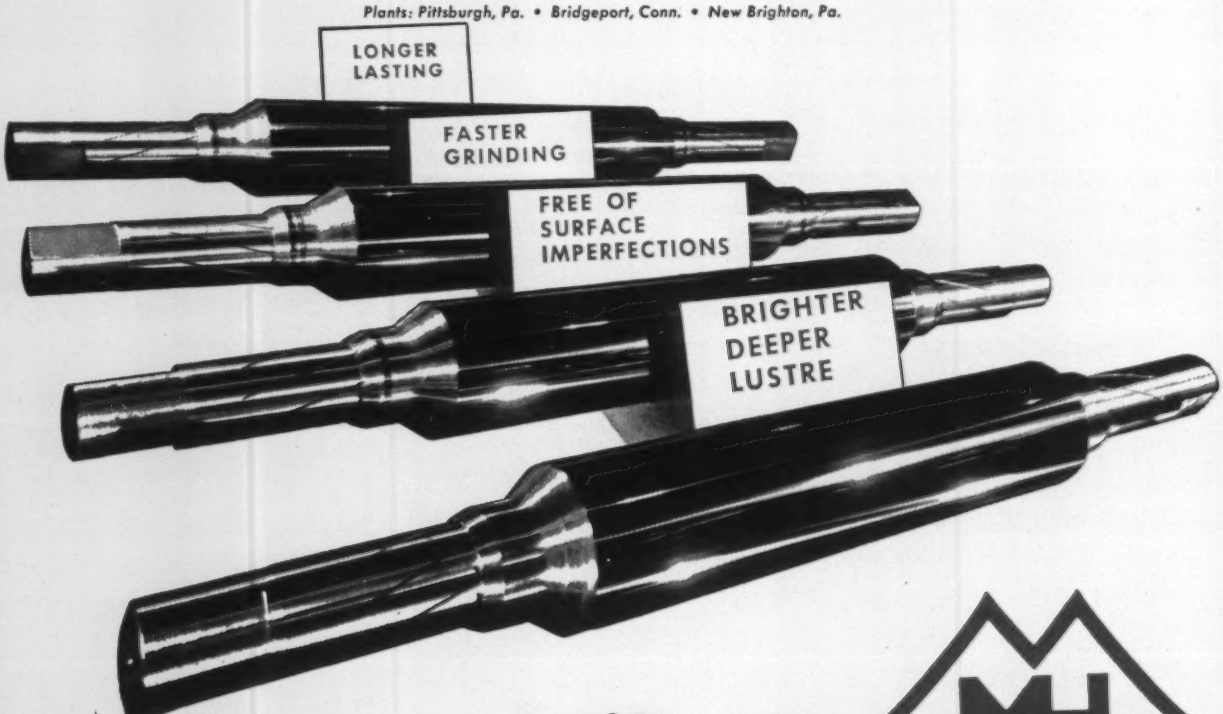


Midvac Rolls

MH

TINY WHISKERS: Oxide whiskers form when iron is reacted with dry oxygen. Electron-diffraction analyses show these whiskers to be pure Fe_2O_3. Each whisker grows from a specific site on the metal's surface.

Are Hydrogen Ions the Culprits That Cause Metal Corrosion?

In India, an iron pillar has resisted extensive corrosion for more than 1600 years.

A new theory may help us to understand this pillar's remarkable corrosion resistance.

■ Everyone is familiar with rust. It affects industry in many ways. In the United States alone, the corrosion of iron is estimated to waste about $6-7 billion per year.

Car owners, for example, spend more than $75,000,000 every year for the replacement of auto mufflers. Yet the basic cause of iron corrosion has—until now—been a scientific mystery.

But the riddle is being solved. Based on work performed at the Westinghouse Research Laboratories, Westinghouse Electric Corp., Pittsburgh, a new explanation for the rusting of iron is advanced.

Pin the Blame—The true culprits appear to be hydrogen ions. Known as protons, these ions form one of the primary building blocks of matter.

Water vapor originates the hydrogen ions. Then, the tiny ions penetrate the iron and enlarge the sites where oxygen normally combines with the metal. This spreads the reaction throughout the surface of the iron, causing it to rust destructively.

Until now, a standard explanation for iron corrosion centered on an electrochemical reaction. Tiny local areas on the metal's surface are assumed to act as cathodes and anodes under an invisible liquid film of water. It is believed that they generate minute electrical currents that corrode the iron.

But in pure single-phase metals these tiny local areas can not be found. Part of the problem is that the reactions are considered too complex.

Basic Action — Westinghouse's new theory suggests that something more basic takes place in the iron, even though an electrochemical reaction may also be present.

In a series of experiments, iron has reacted at 450°C with dry oxygen, water vapor, and mixtures of oxygen and water vapor. These experiments eliminated the conditions needed for electrochemical reactions.

Pure iron wires about as thick as a fine sewing thread were reacted

with oxygen and water vapor at 835°F. Idealized conditions were closely controlled. Results of the minute-scale corrosion have been studied under an electron microscope. Objects are magnified up to 300,000 times.

The scientists report that with dry oxygen, iron forms a protective oxide coating. From this coating billions of tiny round oxide whiskers grow. Some of these whiskers are less than one-millionth of an inch in diameter and 30-millionths of an inch high.

Like a Garden—Each whisker grows from a single, specific growth site on the wire's surface. Growth resembles individual seeds as they sprout from the ground into separate plant stems.

Next, the wires were reacted under identical conditions — except that water vapor was substituted for the dry oxygen atmosphere.

Moisture, from the water vapor, produces a startling change in the oxide surface. From the growth sites erupt thin, pointed, blade-shaped platelets of iron oxide. These platelets spread across the metal's surface.

Shaped somewhat like blades of grass, they are about one-millionth of an inch thick, 30-millionths of an inch wide and 300-millionths of an inch high.

Dense Growth—As they grow in size, they spread more than 50 times in area over the sites observed for dry oxygen alone. The spread continues until a density of nearly one billion per square inch of surface area is reached.

The amount of iron rust the platelets represent is 250 times that which forms when the water vapor —and the hydrogen ions it releases —is absent from the reaction.

The illustrations that appear in this article show four transmission-electron micrographs of the crystal habits of localized corrosion products. All specimens were reacted at 450°C for 48 hours.

Consider the first figure. It shows oxide whiskers that form when iron is reacted with dry oxygen. The dry oxygen has a dew point of —78.5°C. Electron - diffraction analyses show the whiskers to be Fe_2O_3.

These iron-oxide whiskers are formed in addition to the normal oxide film. The diameter of the nucleation sites on the metal remains constant. Area of these sites appears to be independent of time or the extent of oxidation.

Water to Spread — The second figure shows the crystal habits formed when iron reacts with a 10-pct water vapor plus a 90-pct argon mixture. Many thin-pointed, blade-shaped platelets form. Electron-diffraction analyses reveal that these platelets are also Fe_2O_3. Their surface density is about $10^8/cm^2$.

Note the shape of these oxide platelets. The shape suggests that the site for reaction enlarges as the reaction proceeds. But in the iron-oxide reaction the area of the site remains constant.

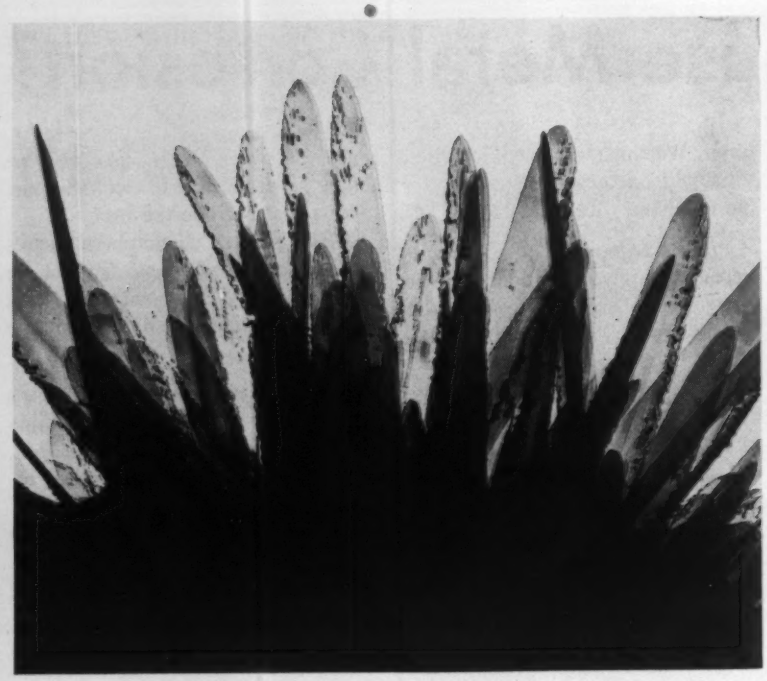
Uniform thickness of these platelets reveals that the width of the nucleating area remains constant. One explanation for the water vapor's effect is that hydrogen atoms or ions from the water vapor act to enlarge the area for reaction.

The last two figures show the crystal habits of the corrosion product when iron is reacted with mixtures of oxygen and water vapor corresponding to mole ratios of O_2/H_2O at 30/1 and 9/1.

Prevent Growth—Oxidation platelets are the predominant crystal habit for both environments. To prevent the growth of oxide platelets the O_2/H_2O ratio must be increased to a high value.

At 450°C the influence of water vapor on the localized corrosion process is much greater than its influence on the corrosion of iron at room temperature.

Experiments show that less than one part of water vapor in 200 parts of the dry oxygen atmosphere will cause the blade-shaped crystals to form. At room temperature this



CRYSTAL FORMATIONS: When iron reacts with a 10-pct water vapor plus a 90-pct argon mixture, many thin-pointed, blade-shaped platelets form. Surface density of these platelets is on the order of $10^8/cm^2$.

corresponds to a relative humidity of about 3 pct.

Consider in detail the localized growths observed after reacting iron in oxygen and in water vapor plus argon atmospheres. Assuming the same surface density for the whiskers and platelets, the electron micrographs suggest that the reaction sites in the metal—for the water reaction—are 50 times the area of those observed for the dry oxygen reaction.

The total amount of oxide in the platelets is about 250 times the amount of oxide in the oxide whiskers.

Hydrogen Ions — "We conclude that the hydrogen ions in the water vapor enlarge the areas of chemical reaction between the oxygen and the iron and bring about the metal's greatly increased corrosion," reports Dr. E. A. Gulbransen, Westinghouse researcher.

"At the lower temperatures at which iron usually rusts, this basic reaction is masked," says Dr. Gulbransen. "Complex corrosion products are formed and are not stable," he adds, "thus the corroding metal is often removed from the reaction site."

Westinghouse's experiments give a closer insight to the fundamental process involved in iron corrosion. They also help to explain its mechanism.

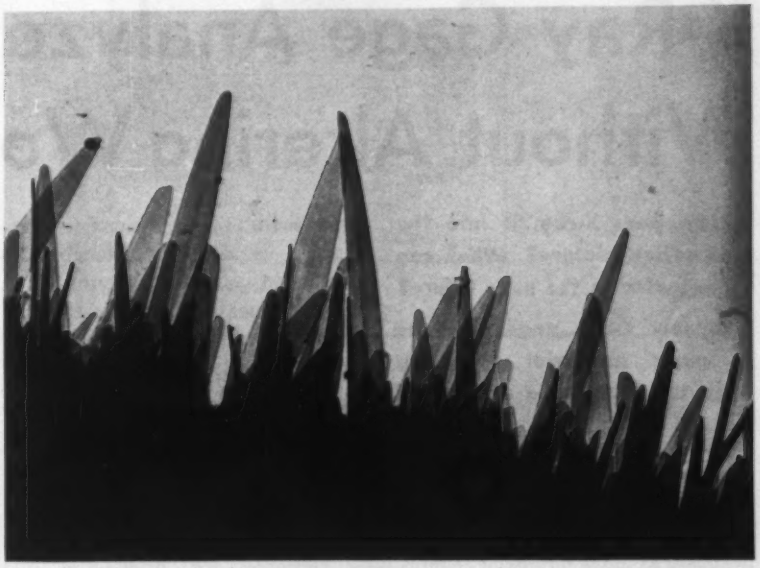
Once such basic understanding is established, better corrosion control will result. Already two control measures which must be considered in addition to any electrochemical effects that are involved in iron rusting have been pinpointed.

Resist Rust—Hydrogen must be prevented from entering the metal. And the growth of the localized reaction sites must be inhibited. Addition of suitable alloying elements to the iron precludes the latter problem.

Rust has been the subject of much speculation and many scientific observations for hundreds of years. For example we have long been intrigued by the iron "Pillar of Delhi" in India. This pillar stands in a dry climate. It has resisted extensive corrosion for more than 1600 years.

Westinghouse's researchers may help us to approach a true understanding of the pillar's remarkable corrosion resistance. Someday this knowledge may prove useful in artificially duplicating the iron pillar's behavior among structures which aren't so fortunately placed throughout the world. This may lead the way to almost uncountable savings in corrosion resistance.

LOW-RATIO MIX: Oxidation platelets are the predominant crystal habit that results from adding 10-pct water vapor and 90-pct dry oxygen.



MORE DRY OXYGEN: At a mole ratio of O_2/H_2O at 30/1, the oxidation platelets are still present. To prevent their growth, more dry oxygen must be added. The higher the O_2/H_2O ratio, the lower the growth pattern.

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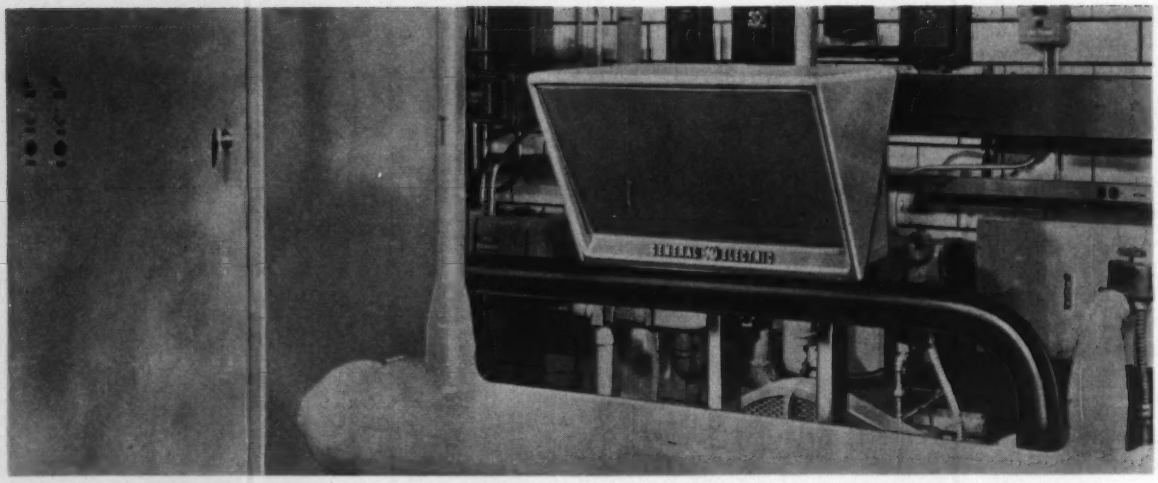


ON-LINE ANALYSIS: Fluid passes under the measuring head. Radiations from the fluid's elements provide the key to chemical analysis. The new gage also analyzes sheets or powdered materials in production lines.

X-Ray Gage Analyzes Materials Without Altering Work Flow

How does X-ray fit into the automation picture? What can be expected in the near future?

A new X-ray gage promises to move industrial chemistry from the lab to the production line.

▪ Multi-element analysis of materials in a steady flow—never before possible—has been born. This promises to move industrial chemistry from the lab to the production line.

Responsible for the birth is a new X-ray emission gage. Called XEG, this gage was developed at the General Electric X-Ray Dept., Milwaukee.

The new gage checks the presence and amount of up to five elements with a reference. Six elements can be checked without a reference.

Measures Radiation—Materials, bombarded by high-energy X-rays emit radiation. This radiation contains the traits of the elements present. It's measured by arranging detectors in geometric patterns. Each detector measures a single element.

Measured radiation from an element reflects the amount of that element in the material being checked. The new X-ray gage checks from aluminum up through the periodic table. It provides a graphic, on-line analysis of a material's composition.

Designed for production and quality control or on-line process control, XEG adapts itself to various material forms. These include: liquids, slurries, solids, dry or moist powders, and sheets or rods in motion. Individual samples of the same materials can also be analyzed.

Adjust Analysis — Two major parts make up the gage. They consist of a measuring head and an electronic control cabinet.

The measuring head houses an X-ray tube. This head also contains collimation slits, analyzing crystals, counter tubes and preamplifiers. All of these members serve in the analysis of desired elements.

A control cabinet forms the other major part. It's designed to house and mount all of the power and measuring units.

Once the gage is set, the cabinet's access door can be closed and locked. Switches for line voltage and the X-ray's on-off control are on the outside of the door. Thus, only authorized personnel have access to the adjustable controls.

Subject materials pass in front of the X-ray tube. The tube produces high-energy X-rays. These energy rays cause elements in the material being checked to emit their trait-bearing radiations.

Reference Check — Radiations are picked up by channels in the measuring head. The head has a total of six channels. Five of these channels monitor preset elements.

The sixth channel measures a reference radiation. This reference

serves as a standard against which the elements are checked.

Radiation from each element produces an electrical signal. After amplification, each signal goes to a strip-chart recorder. The recorder logs the quantity (or other desired unit) of each element. Signals can also be fed to data loggers, computers and/or control devices.

Low Time Lag — All selected signals are continuously measured at the same time. Resulting data are registered on recorders, indicators or other devices.

Time constant on the output signal is variable from about 0.5 seconds to 20 minutes. The preset time length depends on the intended use. It's also a factor of the desired accuracy.

For instance, if short-term variations in a steady flow are to be studied or used, then a short time-constant is selected. However, the short constant may result in lower accuracy. Conversely, for long-term variations and/or high accuracy, a long time-constant is used.

Many Uses — Output from the gage serves for computing, control and indication. It can be calibrated to show analysis in many desired amounts. These include pct of element present or pounds per ton. Other X-ray sensors are available for thickness control of sheet metal or other strip materials.

There is almost no limit on uses for the XEG. They include the steel, chemical, cement, petroleum and pharmaceutical industries. The new gage can even control on-line processes from the waste end. Or it can control the incoming flow of materials to a production line.

In what fields are automation and the industrial X-ray becoming more prevalent?

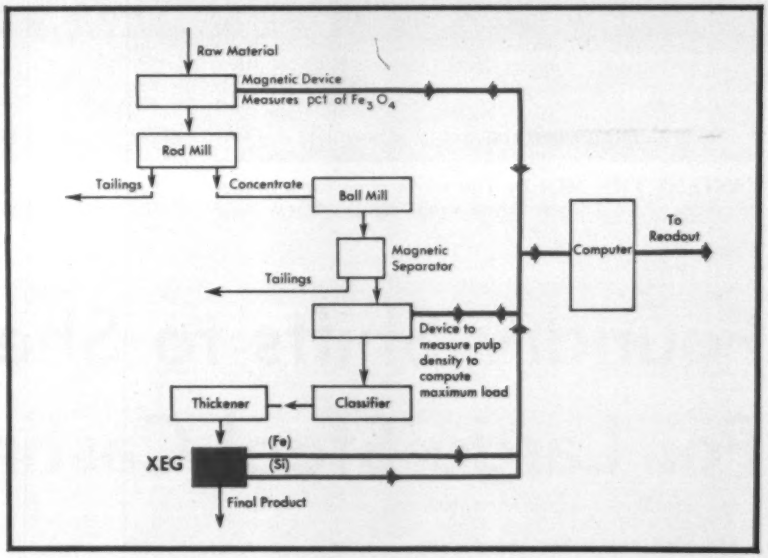
H. W. Poole, GE marketing consultant, states: "In recent years it (automation) has spread to continuous process fields where you can deal more rapidly with the fluid process. . . . At the same time, the current vogue of designing and using electronic computers as a part of the automation process shows promise."

Good Future—"Of course," adds Mr. Poole, "the influx of X-ray equipment also promises to open other doors."

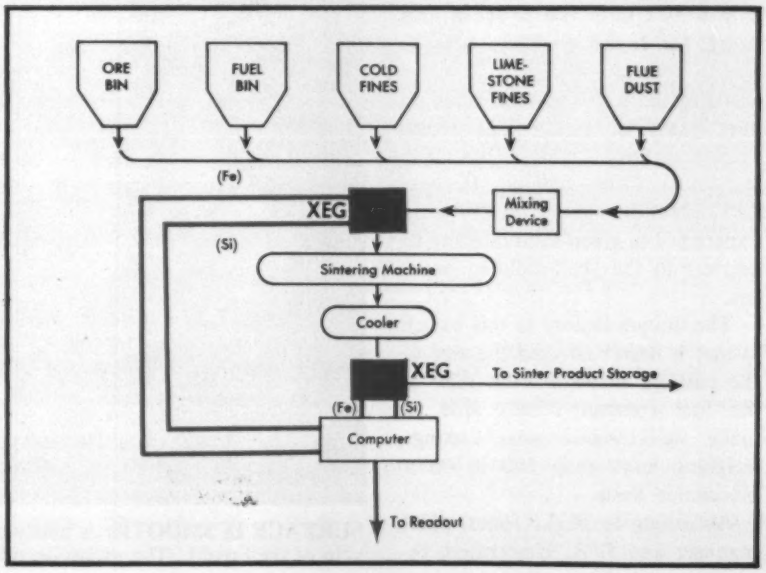
GE's new X-ray gage controls the degree and quality of finished mixes and blends. It can also check the efficiency of a process—and thus refine the process—by analyzing elements in the end product.

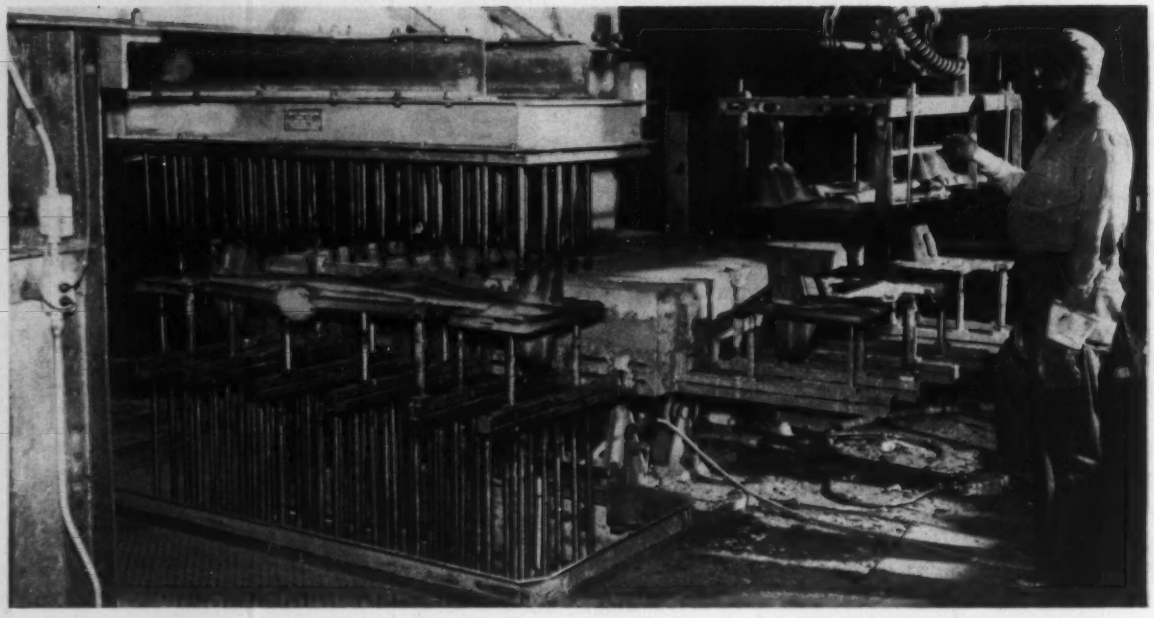
Speed, accuracy, flexibility and non-destructiveness of X-ray chemical analysis adapt it to a wide range of industrial uses. It has already replaced wet-chemical analysis in many plants. And now the GE engineers have put X-ray squarely on the production line, it promises to replace many more.

X-Rays Increase Iron Output



Gage Controls Sintering Work





FASTENS THE MOLD: The warm cope for a brake-beam shell mold lowers onto drag (right). A revolving turntable moves each mold onto bonding equipment (left) where 126 metal fingers fasten cope and drag.

Foundry Shifts to Shell Molds For Large Steel Castings

Mention the "shell-mold process" and one thinks of relatively small, close-tolerance castings.

But, experience at this foundry shows how the process can work for large castings also.

■ After years of research, including two years of pilot plant study, American Steel Foundries has made the move. The Indiana Harbor, Ind., plant has given up 60 years experience in green-sand molding to convert to the shell-molding process.

The unique feature to this switch is that it hasn't affected the size of the castings made. Result: ASF is the first company that's able to make shell-molded steel castings weighing more than 200 lb on a production basis.

According to R. L. Jones, plant manager and J. A. Rassenfoss, director of research, there were a number of reasons for switching to shell molding.

Less Casting Woes—There is no problem of non-uniform castings. Precise, duplicate castings with

SURFACE IS SMOOTH: A newly-cast brake beam glows white inside thin skin of shell mold. The process produces smooth surface castings.

smooth surfaces result over and over again. Porosity, inclusions, and shrinkage are held to a minimum. Tolerances are measured in thousandths of an inch. And if special finishing is needed, precision grinding can often be used in place of normal machining.

Because there are few molding defects, weld repair is greatly reduced and often eliminated. Officials estimate that the plant has reduced its consumption of welding electrodes to one-half those used three years ago.

Another advantage of the shell process, Mr. Rassenfoss points out, is the accuracy of core setting and mold closing. The resulting, consistent dimensions permit redesign. In many cases, the weight of a casting can be greatly reduced.

Makes Many Types—Using this process, ASF makes a diverse line of carbon and alloy-steel parts. They range from "fifth wheels" and railroad brake-beams to large industrial valves. Plant capacity is 1800 tons per month.

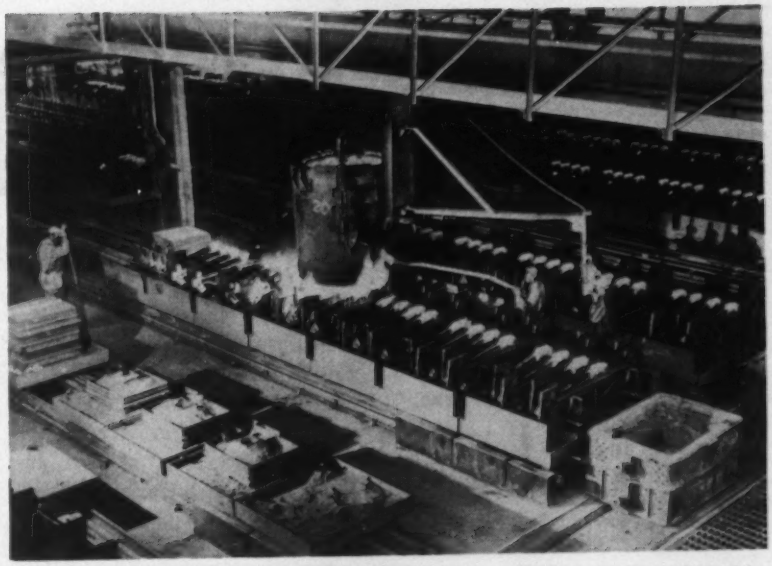
The pictures point up how a railroad brake-beam, for example, is made. The completely automated shell molded system includes two molding machines, a mold takeoff, and mold carrying and bonding equipment.

The first step takes place in the drag molding machine. Resin-coated zircon sand is baked around the steel pattern of a brake beam. The cured drag is then pushed up from the machine for core setting and laying of paste.

Joins Cope and Drag—The cope, made in the same manner, then lowers onto the drag. A revolving turntable then moves the two mold halves onto the bonding equipment. There, 126 metal fingers press the pasted cope and drag together.

Casting of the brake beam, as for all castings at ASF, is from bottom-pour ladles. A finished brake beam weighs about 130 lb.

After the cast brake-beams are removed, racks which held the shell molds during pouring are moved by conveyor to the shakeout station.



POURS BRAKE BEAM: Molten steel pours into freshly formed shell molds to turn out cast-steel, 130-lb brake beams for freight cars.

SAVE THE SAND: Used molding materials are automatically shaken out through floor grills onto conveyors headed for reclamation unit.

Used molding materials are automatically shaken out to fall through the floor grill onto conveyors.

Reclaims the Sand—The burned sand then heads for the reclamation center. Here, the hot, used sand is screened, fired and cooled before delivery to mills where resin and other constituents are added.

This operation is wholly automatic. A massive electronic control panel guides the giant sand mixing system which is in 24-hour use. The system can process up to 10 tons of coated sand per hour.

Living Ratios Produce Formulas To Gage Capital Evaluation

By S. A. Tucker—Partner, Martin & Tucker, Little Neck, N. Y.

Simple ratios and charts give economic meaning to isolated changes in company operations.

They help to blend production needs with a sound state of financial health.

■ Previous parts of this series stressed the need for economically-weighted data. The central theme of the entire series is how to avoid decisions based on single facts.

What must now be considered is of prime importance. How do production and sales activities affect the financial health of a company?

Vital Link—Sales provide the link between production and capital. Sales action generates the "product mix" sold. If this mix is rich in usage of equipment which has high machine-hour rates, then production needs are satisfied in terms of expense recovery.

However, the optimum product mix—for production economy—may also depend on a large inventory. This could unbalance the capital safety of a company. Management must therefore select a product mix which blends productional needs with a sound state of financial health.

In the financial and capital areas, ratios can be constructed and interwoven. These ratios and their charted relationships are similar to those in the production and sales areas.

Use Living Ratios—Simple ratios and charts give economic meaning to changes in isolated values. As external-capital events change, so do the elements of financial health. All changes must be known because they affect a company's capital structure.

Where do you start? A list of elementary ratios appears in table form. These ratios evaluate the capital-structure strength and the quality of financial management.

Consider ratio FI. This ratio measures net-worth turnover. It shows whether overtrading or undertrading is present. Overtrading refers to a high level of sales for the capital invested. It invariably requires higher credit. As a result, sometimes the creditors have more money at stake than the owners.

As the ratio of liabilities to net worth increases, the creditors' margin of safety is reduced. Why? Because any drop in earnings puts the company in financial trouble. A general trend toward price reductions also causes money problems.

Check Resources—Ratio FIV is the index for return on total resources. This is the ratio between the net profits earned on sales and the total assets of the business. It shows how many asset dollars are needed to produce a dollar's worth of profits.

PLANNED PROFITS

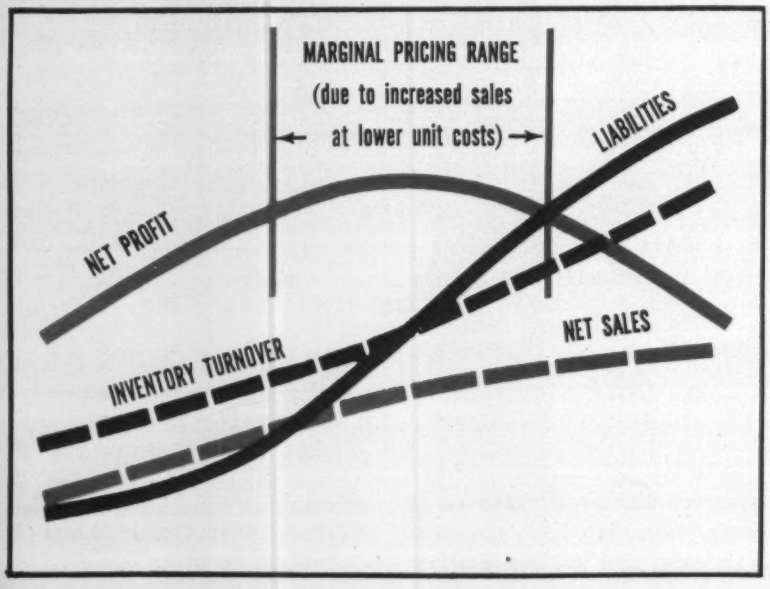
This is the last of a four-part series of articles on planned profits.

The first article discussed controls for management.

The second article covered control of production profits.

Last week, Mr. Tucker discussed control of sales.

Plot Optimum Amount of Sales



Since this is a general ratio, it doesn't pinpoint all contributing factors. But this ratio helps to assess the profit-asset relationship for different product lines. It's most useful in rating similar plants in a multi-plant operation.

Ratio FIV expresses the potential profit from the use of all company resources. It is often mistaken for the return-on-investment ratio.

If a company earns a higher profit on its total employed capital than it pays in interest on borrowed-money, then the stockholders reap the extra benefits. The decision on how far to carry this financial program calls for a proper balance between owned and borrowed capital. This balance must remain consistent with a sound current ratio.

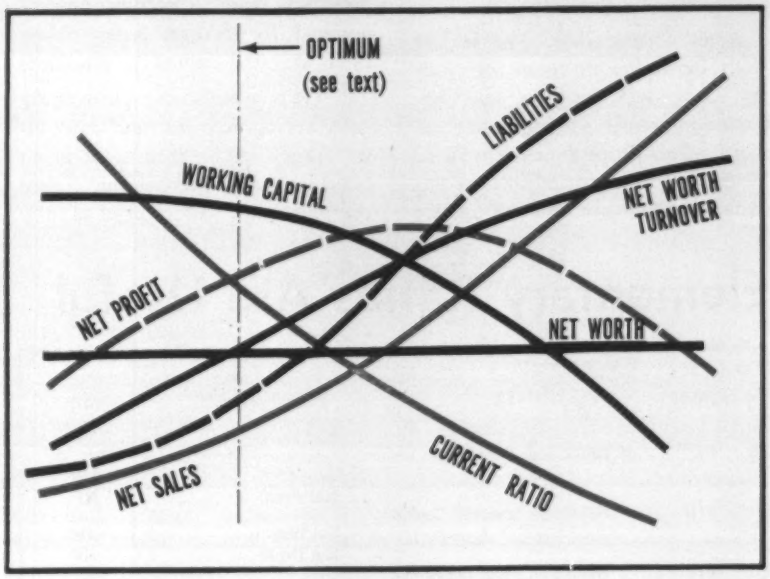
Profit Range—Fixed-asset productivity is reflected by ratio FXI. This ratio measures the power, virility and productivity of the equipment and other capital investments. This is one of the most important ratios in the managerial-controls (or MC) technique. It shows how broad or restricted the range is in which sales are made at a profit.

If this ratio decreases, it may be the result of insufficient sales—even with a balanced fixed-asset versus net-worth structure. If sales are okay it could be that the fixed-asset level is too high. Sometimes a company sets this level too high for what the sales effort can reasonably produce and/or too high in comparison to net worth.

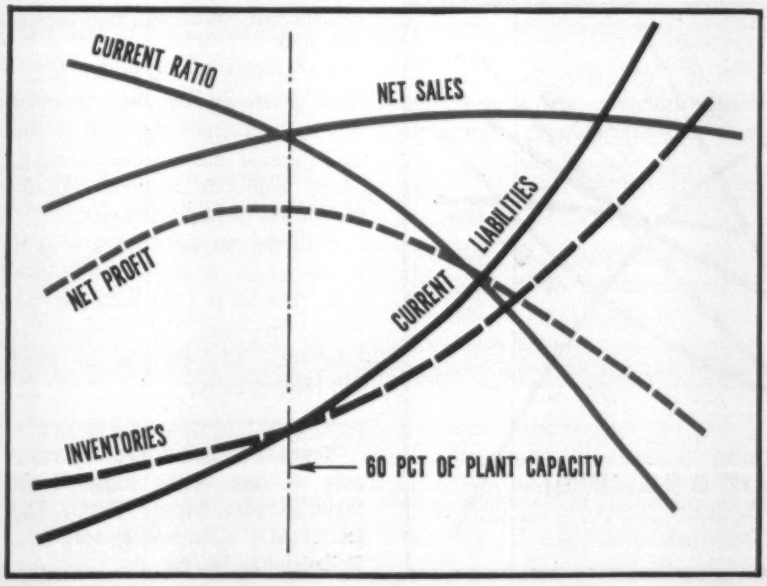
The ratios presented in this article provide both upper management and financial management with an appraisal of the existing capital-structure strength. They also show the direction in which this strength is headed. In addition, the living ratios give an insight into future effects of proposed management decisions.

Charts show the movements of events and their changes on a company's financial state. Ratio-curve movements plot the response of financial factors to outside stimuli.

Avoid Effects of Overtrading



Can Sales Lead to Insolvency?



Decide Optimum Sales—The first chart shows the relationship between net profit, liabilities, inventory turnover and sales. In this chart, inventory turnover is too high. This causes a sharp increase in liabilities. As a result more money must be borrowed. Naturally this builds up the interest charges.

Interest expenses are a charge against profits. The chart depicts this relationship by a leveling off of the net profits. Sales increments are slow and gradual compared to the other curves. This is a specific local characteristic. It isn't true for all manufacturers.

There is a plateau in the net-profit range—within which a lower

sales level reduces the inventory turnover. Within this plateau, liabilities are also reduced.

Avoid Overtrading—The second chart shows the effects of overtrading. Liabilities surge as sales become too great for a company's net worth. This drops the current ratio. Then, due to increased interest expenses—which are charged against overall profits—the net profits begin to level off.

At this point, it becomes uneconomical to increase sales unless more invested capital is attracted.

Some companies, particularly those selling machine time, can't always back off on their sales in an effort to avoid overtrading. These companies have a high level of period or standby expenses.

Preclude Losses—If not recovered rapidly, heavy fixed-expenses lead to large losses. Controls which spot hard-to-change patterns are vital to all companies who sell machine time.

Sales can pave the road to insolvency. Consider the third chart. It shows a steady increase in sales. After a time the climb in sales becomes too great for the capital structure to support it.

The nature of this business requires high inventory levels. Unfortunately, the collection policy isn't tailored to this need. As a result, the credit level drops.

Net profits begin to fall off at about 60 pct of the plant capacity. In other words, the company can't make full use of its facilities.

The last chart shows the record of a mechanical-apparatus maker. In a short period this company's management boosted sales with a fantastic increase in profits.

Problems Ahead — Is this company headed in the right direction? The curve of INV/NW helps to provide an answer. The company's inventory exceeds the net worth by more than 2:1 at the end of the study period. And the fixed-asset level is okay.

However, the company is still on shaky financial ground. Sales increases are stressing the capital structure.

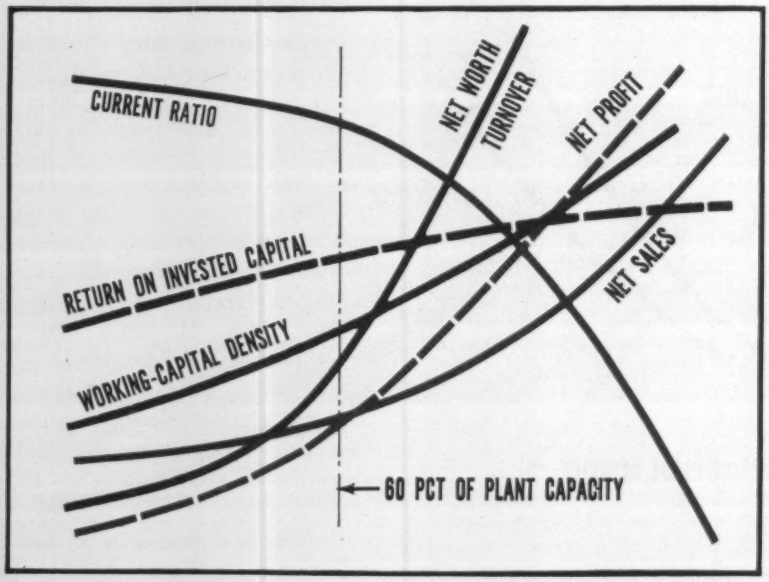
Overtrading is also taking place. This is shown by the curve of NS/NW. Toward the end of the study period the inventories swell. Thus, liabilities increase out-of-proportion to sales increases.

With the net worth as low as it is, the return on investment is very high. But so is a 20:1 shot at the races. In effect the company is gambling. The slightest ill wind will blow it away.

Elementary Ratios Are Useful

RATIO NUMBER	TITLE	FORMULA	SYMBOL
FI	Net-Worth Turnover	Net Sales / Net Worth	NS / NW
FIII	Return on Invested Capital	Net Profit / Net Worth	NP / NW
FIV	Return on Total Resources	Net Profit / Total Capital Employed	NP / TCE
FV	Total-asset Productivity	Net Sales / Total Assets	NS / TA
FXI	Fixed-Asset Productivity	Net Sales / Fixed Assets	NS / FA
FXVII	Working-Capital Density	Inventory / Working Capital	INV / WC
FXIX	Fixed-Capital Utilization	Fixed Assets / Net Worth	FA / NW

Risky Finances Cause Trouble



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MIRROR FINISH—The diamond lathe tool turns this smooth finish in one pass. A surface finish of about 6 microinchs results from the diamond turning operation. No coolant is needed for the job.

Diamond Tools Turn Microfinishes

Diamond tools can save a final finishing operation on turned parts.

Here's how one user saves time and money on his final cleanup cut.

▪ Micro tolerances can be obtained on a standard lathe by using diamond cutting tools. The tools will produce a 6 microinch finish on turned parts.

Metal rolls for rotogravure printing are turned on standard lathes to micro tolerances at Southern Gravure Service with single-point diamond tools.

Rigid control is required to machine these printing rolls (length up to 75 in., diameter up to 15 in.) to the perfect finish necessary for rotogravure engravings.

The surface must have a finish of 2 microinches or better. The cylinders must be in absolute concentricity with zero taper and runout. The diameters of the finished cylinders must be within 0.0005 in of specified dimensions.

Savings Claimed — Shaped diamond lathe tools reduce the cost and increase production in preparation of the metal rolls for engraving.

Cast iron, steel, or aluminum cylinders are used as the base of the rotogravure rolls.

These cylinders are first electroplated with a 0.015 in. thickness of copper. The cylinders are then turned on a lathe, polished, etched and finally flash chromed for protection before being shipped to printers throughout the country and overseas.

Clean Cut—The present method of machining the printing cylinders consists of three operations. First, a face cut is taken on the rolls with a carbide lathe tool, bringing the roll reasonably close (but oversize) to the final diameter.

A single-point diamond lathe tool turns the roll to within 0.0005 in of final diameter. The diamond tool leaves about a 6 microinch finish on the surface of the roll.

The cylinder is then transferred to a grinder and quickly brought to a 2-microinch surface finish.

Feed And Speed—When turning the metal rolls with diamond lathe tools, the rolls are rotated at a speed of from 500 to 1200 sfm. Much of the diamond lathe work is done at 1000 sfm.

Depth of cut with the diamond tool is 0.005 in, this clears the cylinder surface of carbide tool marks which are from 0.001 to 0.005 in deep.

Speed of the diamond tool's forward motion on the cylinder face depends on the speed at which the cylinder is being rotated in the lathe.

Extended Life—After four years, the three original diamond tools, are still in use and show only a small amount of wear. Three work shifts use the diamond tools for a total of 12 hours per day.

Coolants are not needed. Tests indicate that tools will hold up just as well when operating in the dry state.

PUSHBUTTON CONTROLS—Four buttons control the feed and speed of the head, spindle, table and saddle.

Speed Boring Mill Production With Fingertip Controls

New design features on a horizontal boring mill add to its production efficiency.

A four-button control unit gets its command and instantly places the tool where it should be—in the cut.

■ A new series of horizontal boring mills that can be controlled, literally, by only two fingers has been developed by The Bullard Co., Bridgeport, Conn. This dynamic control system reduces non-productive time by bringing the tool and the work together.

In addition the trade-named, Dynamill, offers several other firsts. The most revolutionary of these is the provision for easy and accurate positioning of the work and the tool.

This is done by means of clock-type dials and variable traverse rates which are controlled through the portable pendant. The pendant places complete machine control in the operator's hand—requiring the use of only two fingers.

Another feature is an infinitely variable feed rate. To obtain optimum tool productivity the feed rate can be increased or decreased while the tool is in the cut.

How Units Save Time — It is essential that the operator know the exact location of the work and tool to bring them together in the shortest possible time.

To do this easily, the new Dynamill has a series of large, easy-to-read clock-type dials, all located in plain sight of the operator at his normal control position. They can be read rapidly and without confusion to an accuracy of 0.0005 in.

The location of the head, the table, the saddle, and the spindle is each indicated by a separate three-pointer, two-scale dial — reading from 100 in. down to a thousandth of an inch.

A red pointer on the outer dial makes one revolution in 0.100 in.; a black pointer on the outer dial makes one revolution in 10 in.; and a black pointer on the inner dial makes one revolution in 100 in.

Each of these dials is resettable —allowing the operator to choose any zero-reference point.

The head and table dials are actuated by precision racks and give

readings which are independent of the screw-drive mechanism and have a repetitive accuracy of 0.0002 in.

Two-finger Control—The single pendant provides two-finger control over all traverse and feed motions of head, spindle, table, and saddle. It has a pistol grip for the operator's convenient grasp.

It is supported from a flexible steel cable, which swings from the end of a boom extending out from the top of the head-post. Thus, the operator can move about freely and station himself wherever it is most convenient.

With this new power-control and accurate dial system, verniers and end measures are not required, thereby eliminating the need of hand cranks.

How the Pendant Works — The pendant has an ingenious rotating turret, mounting four buttons. With these four buttons, all directions of movement of head, table, saddle, and spindle can be controlled.

In one position of the turret, with the buttons at 12 o'clock, 3, 6, and 9 o'clock, the buttons actuate, respectively, movement of the head up, table right, head down, and table left.

By rotating the turret 45°, four different movements are actuated—correspondingly; spindle retract, saddle advance, saddle withdraw, and spindle extend.

Finger-tip Speed Control—The speed of traverse, and the engagement of the feed, are controlled by pulling or pushing a trigger on the pendant. By the amount of pull exerted, the operator can select from four traverse rates.

For example, with full pressure on the trigger, he can traverse the member rapidly toward its desired position, and then gradually slow down the traverse by easing up on the trigger pressure.

With no pressure on the trigger and a directional button engaged, the member being traversed will travel at a creep rate. The creep rate can be adjusted to suit the operator.

Once the tool has been placed in the right position, the feed is engaged by pushing the trigger until it locks. The feed can be instantly disengaged by pulling the trigger back to the neutral position.

Preset Spindle — The Dynamill has variable feed rates ranging from 0 to 0.125 ipr and 0 to 108 ipm. The feed rate may be changed while the tool is cutting. This permits maximum tool performance and allows for changes in stock removal.

Spindle speed rates are selected by two buttons on the side of the pendant. The speed rate is preset on a large dial mounted on the head. Once the spindle speed has been selected, the spindle is started and stopped by two buttons on the pendant.

New Type Bearing Way—Another feature of the Dynamill is the hardened bearing way material and the manner of locking it in place on the bed and the saddle.

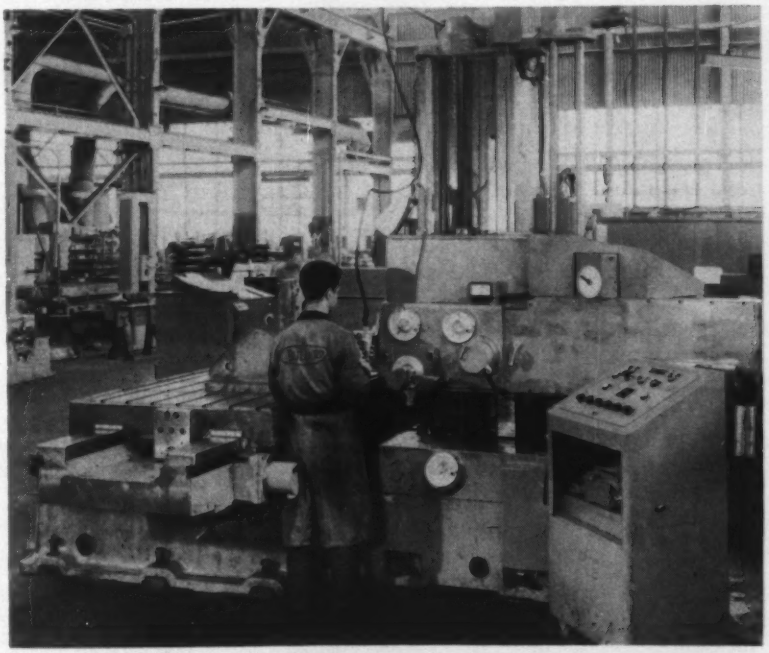
The way strips are precision-ground steel with a 0.0015-in. hard chrome plate. These inserts are locked securely in place by rolling in a copper-alloy binder.

If it should become necessary to replace the ways, the strips can be quickly removed by pulling out the copper binder. Machine downtime is minimized since extensive resurfacing are eliminated.

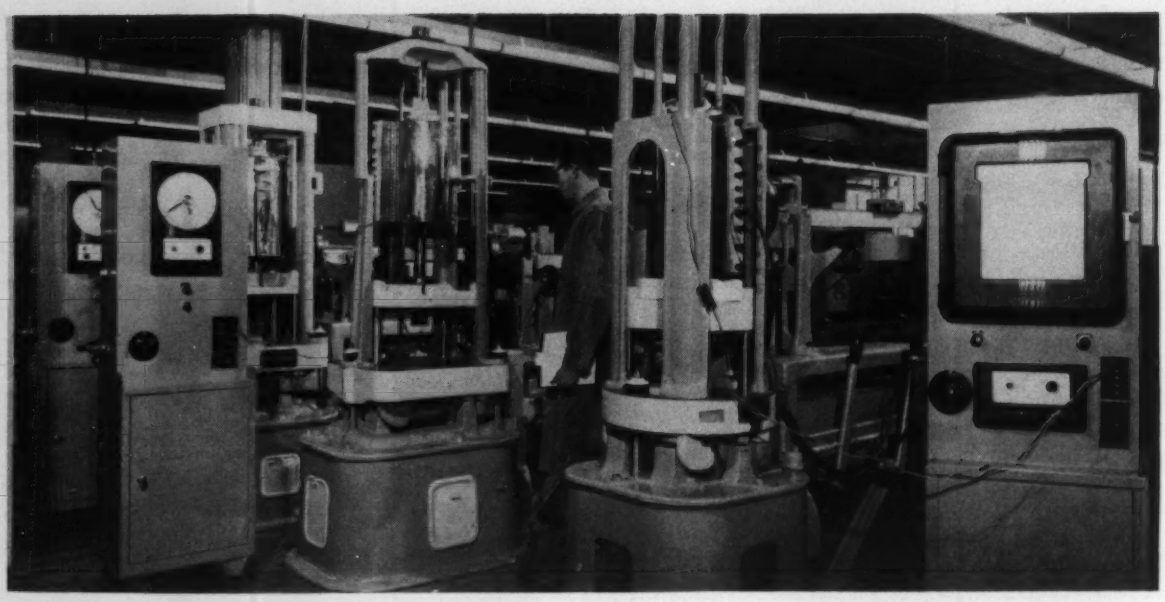
Also Fitted for Tape—The mill can be fitted with automatic tape-control for the head and the table. It has been designed to accommodate a modified General Electric Mark I system which includes a tape reader and a manual digital in-put system.

The clock-type positioning dials give an accurate read-back of the functioning of the tape-control or the digital in-put system. This makes it possible to check the reliability of the programming. The tape system can also control milling functions in any combination of straight lines or at 45-degree angles.

The mill can be retrofitted for tape control in approximately four days, since no modification of the basic machine is necessary. If only manual digital control is required, the tape reader may be eliminated.



NO MORE CRANKS—With the power-control, verniers and end measures are not needed, thereby eliminating the need of hand cranks.



TESTING SOLID BOLTS—Converted stress rupture machines reflect a true picture of the bolt's properties.

Converted Bolt Testers Fill Gap

High-capacity machines for stress-rupture testing of bolts are hard to come by.

Here's a case where outdated universal testing machines were converted to fill an important gap.

■ Through conversion of outdated test apparatus, Standard Pressed Steel Co., Jenkintown, Pa., has equipped itself with high-capacity stress-rupture machines. These machines check the pedigrees of large diameter bolts at high stresses and at elevated temperatures.

The converted equipment consists of three beam-and-balance type universal testing machines. Their adaption to stress-rupture work allows SPS to conduct special tests.

Plugs a Gap — Standard stress-rupture machines can't handle the special work. Why? Because they do not have sufficient capacity for full-size, high-strength bolts.

With the current trend toward larger bolt diameters and the development of stronger bolt materials, available equipment became inadequate. SPS solved the problem by adapting the older testing machines which had been used for tensile, compressive and other static room-temperature tests.

Conversion has plugged a major gap in the SPS test program. The program's aim is to evaluate all bolt sizes—under conditions similar to actual use.

High Loads a Must—The converted machines provide capacities of 100,000, 60,000, and 40,000 lbs. They serve at temperatures from 900°-2000°F. The largest commercial stress-rupture equipment on the market today is in the 20,000- to 30,000-lb range.

At SPS, the high-capacity hybrid machines are used for both research and product testing. For research, they help to improve the design of high-temperature fasteners. For product testing, they certify fasteners that must be tested lot by lot.

Without the three- to five-fold capacity increase provided by this equipment, it would be impractical to "temperature test" bolts that exceed ¾-in. diam. It would also be almost impossible to test diameter sizes greater than ⅜ in. in high-strength products such as the EWB 26 bolt (The IRON AGE, July 21).

Simple Process — Conversion of the outdated testing machines is a simple process. A standard 2000°F electric-resistance furnace has been added to each machine.

Reversible variable-speed motors replace the single-speed loading motors on each unit.

Two micro switches have been added to the end of each beam. These switches sense any out-of-balance condition. They also signal the loading motors when to add or remove load.

A third micro switch added to each machine serves as a shut-off. When the bolt breaks, the beam drops rapidly. It hits the third switch. This stops the heater, the loading motor and a timing clock. The clock measures the duration of the test.

Partners in Progress....

ALLIANCE'S 125/25 Ton, 54' Span, ladle crane installed JONES - LAUGHLIN ALIQUIPPA WORKS.

Greatest over-all return for your investment

Alliance

and the giant STEEL INDUSTRY

To date THE ALLIANCE MACHINE COMPANY has supplied the cranes for each and every L-D installation (Oxygen process) in the United States.

JONES AND LAUGHLIN has recently placed orders for four 300/50-Ton, 58', Span additional L-D cranes. These will be installed at the Cleveland plant. Throughout the years it is this confidence in Alliance's rugged workmanship, high quality, and product dependability that has built THE ALLIANCE MACHINE COMPANY.

For leadership, look to ALLIANCE for the greatest over-all return for your investment.

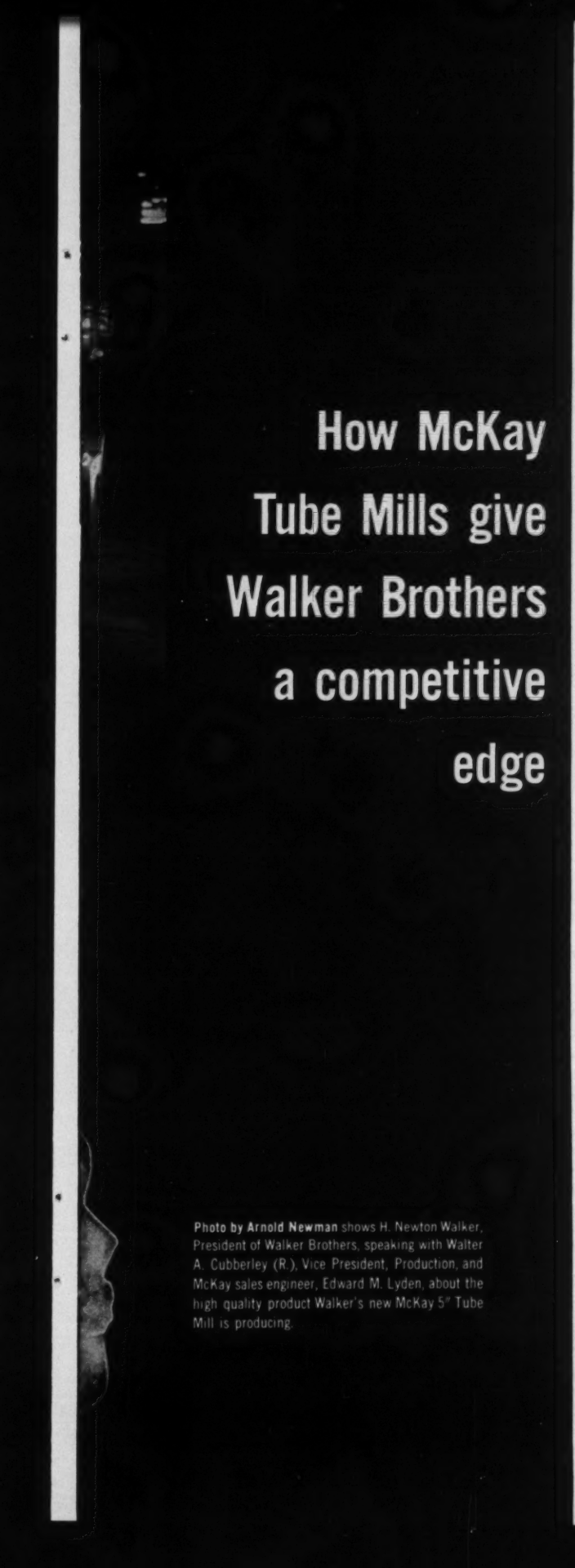
"Give Us The Runway and We'll Lift The World"

Overhead Cranes * Gantry Cranes * Mill Cranes and Equipment * Hot Metal Cranes * Ladle Cranes Stripper Cranes * Soaking Pit Cranes * Soaking Pit Cover Cranes * Charging Machines * Furnace Chargers * Slab Handling Cranes * Bucket Cranes Magnet Cranes * Mold Yard Cranes * Skull Cracker Cranes * Ingot Buggies * Run-Out Tables Car Dumpers * Special Mill Equipment * Ore & Coal Bridges * Loading & Unloading Towers Forging Manipulators * Forging Cranes * Power House & Dam Cranes * Dock & Pier Handling Equipment * Research, Development & Engineering Service * Licensees & Manufacturing Facilities in Other Countries

Alliance

machine company

Main Office • Alliance, Ohio



How McKay Tube Mills give Walker Brothers a competitive edge

Photo by Arnold Newman shows H. Newton Walker, President of Walker Brothers, speaking with Walter A. Cubberley (R.), Vice President, Production, and McKay sales engineer, Edward M. Lyden, about the high quality product Walker's new McKay 5″ Tube Mill is producing.

"Our new McKay 5″ Tube Mill enables us to extend our production range to the larger sizes of Walkerduct and steel tubing. The mill affords close manufacturing tolerances and improved control over production schedules," says H. Newton Walker, President of Walker Brothers, Conshohocken, Pa.

High Quality Product—Walker Brothers has been a primary supplier of high quality electrical distribution materials to the commercial and industrial construction industry for fifty years. "Walker of Conshohocken" products include building wire, power and control cables, mechanical steel tubing, steel electrical metallic tubing, rigid steel conduit and underfloor raceways.

"This is the third McKay Tube Mill we have installed since 1951 to increase our capacity to manufacture conduit and raceways," continues Mr. Walker. "Each of these mills," he says, "has turned out a product consistent with our high standards of manufacture."

Better Production Economies—Walker Brothers has, in addition to the new McKay 5″ Tube Mill, two 3″-capacity McKay mills equipped with strip looping and welding equipment. These mills are generally used to produce ½″ through 2″ thin wall conduit on a continuous basis at a speed of 150 feet per minute. The new 5″ mill also operates at 150 F.P.M. and at that speed can easily produce Walker's line of 6.5″ x 1.5″ x .076″ rectangular raceway.

Mr. Walter Cubberley, Vice President, Production, states: "We have been most satisfied with the performance of this equipment. Performance of the McKay mill has more than met our expectations regarding versatility and cost savings."

Low Maintenance Cost—"There's something to be said for the design of this equipment, too," he says, "in that maintenance is, and has been, satisfactorily low regardless of the age of the machinery."

"This is very solid equipment, including the welder. In fact, I would say these are the best mills we could have selected for our type of operation," Mr. Cubberley concludes.

McKay Machine designs and builds electricweld tube mills for high speed production of ferrous and nonferrous welded tubing up to 20″ in diameter. The experience of nearly 25 years of pioneering in the design of tube making equipment is behind each modern McKay Tube Mill.

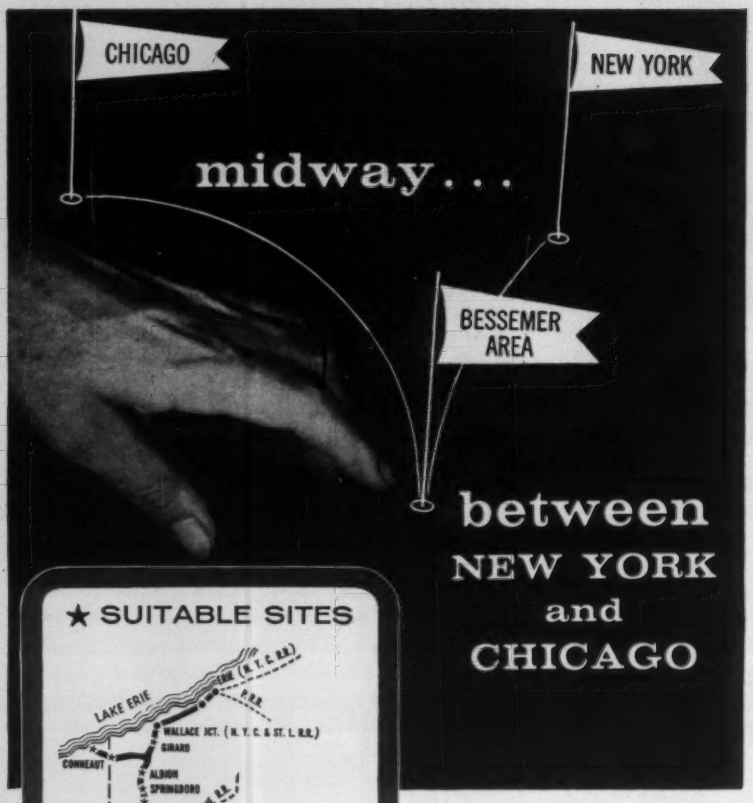
Write for literature, or send a description of your needs for prompt quotation to McKay Machine Company, Youngstown 1, Ohio.

LOOK TO

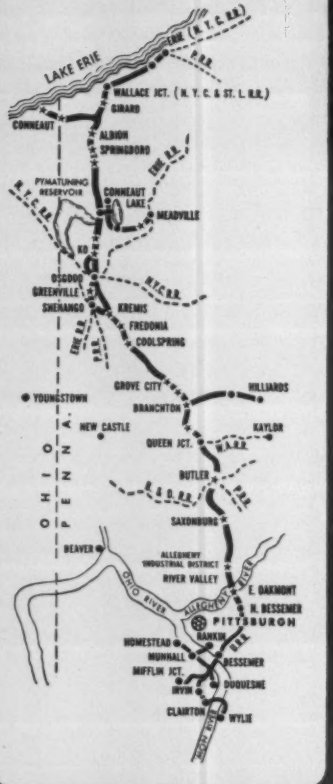
McKAY MCK MACHINE

FOR PROGRESS IN METAL PROCESSING

another Bessemer location advantage



★ SUITABLE SITES



The Bessemer Area is one of the world's greatest industrial markets with a $5-billion primary and fabricated metal output. Reach out 125 miles—and you tap a lucrative market of over 8 million consumers.

Other Bessemer Area advantages are: 24-hour delivery of steel and other basic materials; extensive deposits of coal, limestone, clay and aggregates; a labor force of over a million widely diversified as to skill; choice of unexcelled, adaptable, flood-free sites served by abundant water, gas and power.

Investigate today! Write or phone for location factors on any of the suitable plant sites indicated by stars on the map. No obligation. Strictly confidential.

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PATENT REVIEW

New Patents In Metalworking

Sulfur-Free Metals

Process for elimination of sulfur from metals, J. H. Brennan and C. G. Chadwick (assigned to Union Carbide Corp., New York), June 7, 1960. In the removal of sulfur from metals, ferrochromium, and other alloys, the metal or alloy is mixed with a tin compound and heated under vacuum. The tin and sulfur react to form a readily removable, volatile stannous sulfide. No. 2,939,784.

Age-Hardenable Alloy

Titanium-hardened nickel-cobalt-iron alloys, A. W. Franklin and J. B. Barber (assigned to International Nickel Co., Inc., New York), June 21, 1960. A high-strength, low thermal expansion, age-hardenable alloy consists of 22-36 pct Ni, 5-30 pct Co, 1.25-1.75 pct Ti, and the balance substantially all Fe. No. 2,941,882.

Applies Tin to Steel

Immersion tin plating and composition therefore, M. A. Streicher (assigned to E. I. du Pont de Nemours & Co., Wilmington, Del), June 14, 1960. In a method for applying tin coatings to steel sheets, the steel is cleaned, roughened, and immersed in an aqueous coating. The coating is comprised of stannous sulfate, sodium bisulfate, and a polyalkylene oxide or the like. No. 2,940,867.

Iron Mold

Ingot mold made of spheroidal graphite cast iron, E. Guenzi (assigned to Compagnie de Pont-a-Mousson, Pont-a-Mousson, France), May 24, 1960. An ingot mold for steel ingots is composed of spheroidal graphite cast iron. It has a volume ratio of side walls to mold cavity between 0.79:1 and 0.4:1. No. 2,937,424.

Bathyscaph "Trieste", looking like something straight out of Jules Verne, has already made more than 50 scientific voyages to the ocean depths. High-strength nickel-chromium-molybdenum steel protects occupants of spherical cabin from underwater pressures up to 1100 atmospheres, or more than 16,000 pounds per square inch.

Built to explore an unknown world

How nickel alloy steel guards explorers against the crushing pressures of ocean depths

The bathyscaph, a deep-sea vessel, was invented by the Swiss professor, Auguste Piccard, who in the past years has built two: the first one was FNRS 2; its steel cabin is now used by the French Navy (FNRS 3). The other one is "Trieste", now property of the U. S. Navy.

"Trieste" has been down 65 times and recently set a new world's record by descending 35,805 feet below the surface of the Pacific Ocean.

At these depths, water pressure would crush a conventional submarine. But the bathyscaph is not so vulnerable...

Its cabin, hanging under the ship's hull like a giant bubble, is specially designed, using high strength nickel-chromium-molybdenum steel three and a half inches thick. This steel bubble, weighing eleven tons and nearly seven feet in diameter, is large enough to hold two men in comfort – *and safety*.

Problems solved. In perfecting the bathyscaph, its designers naturally ran into many problems. But one by one they overcame their difficulties. And quite often it was with the help of Nickel...

This is especially true of the Nickel which is part of the nickel-chromium-molybdenum steel of the cabin. They have Nickel, too, in the stainless steel of vital instruments, among them those in the ballast releasing system. And they also use Nickel in electrical resistances which operate as thermometers for water temperature.

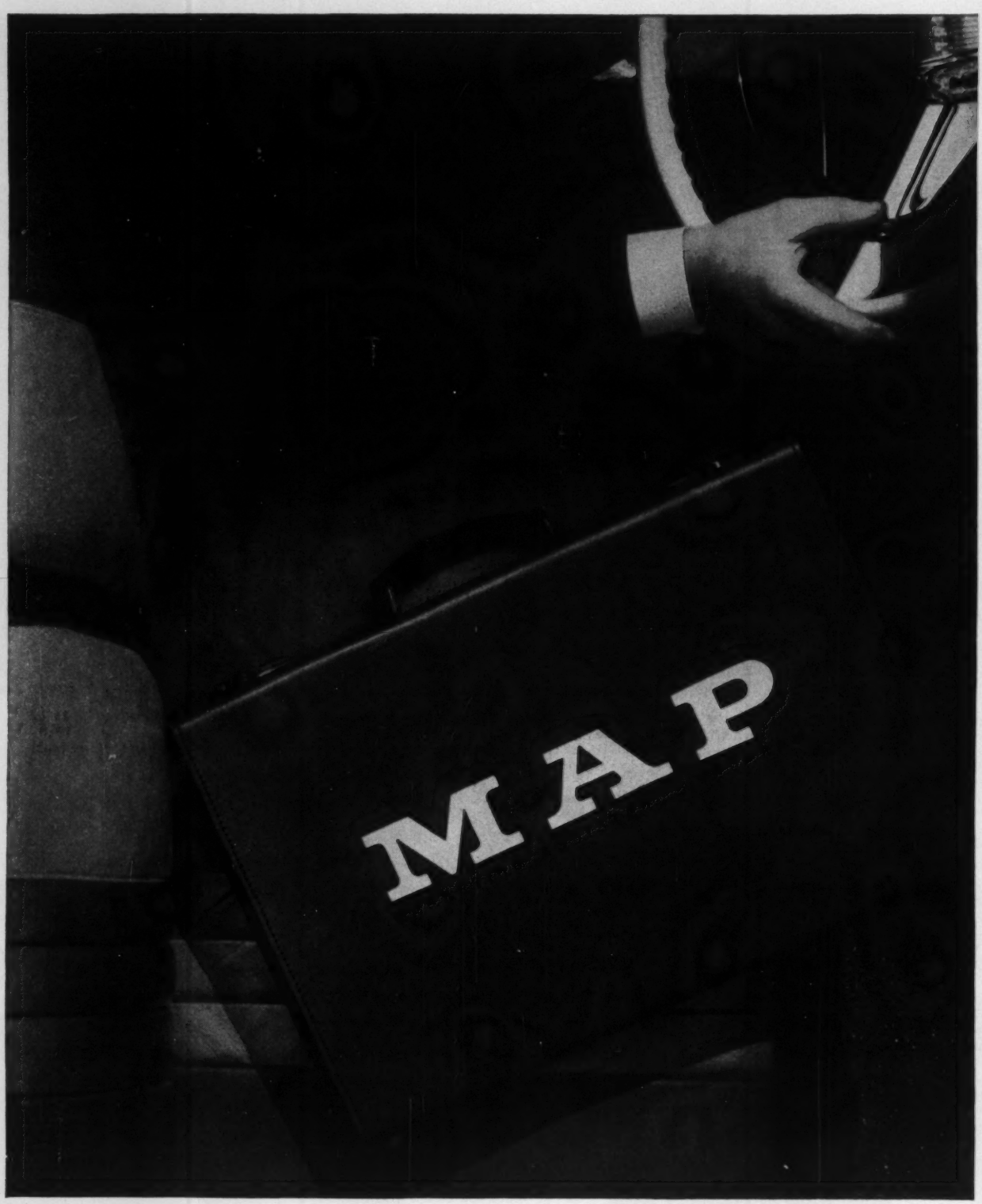
A metal of many uses. Either alone or with other elements, Nickel improves hundreds of alloys, making possible almost any desired combination of properties for meeting specific fabricating or service demands.

Do you have a metal problem? One that involves corrosion ... stress ... fatigue ... high or low temperatures or some other troublesome factor? A nickel-containing material may provide *your* answer.

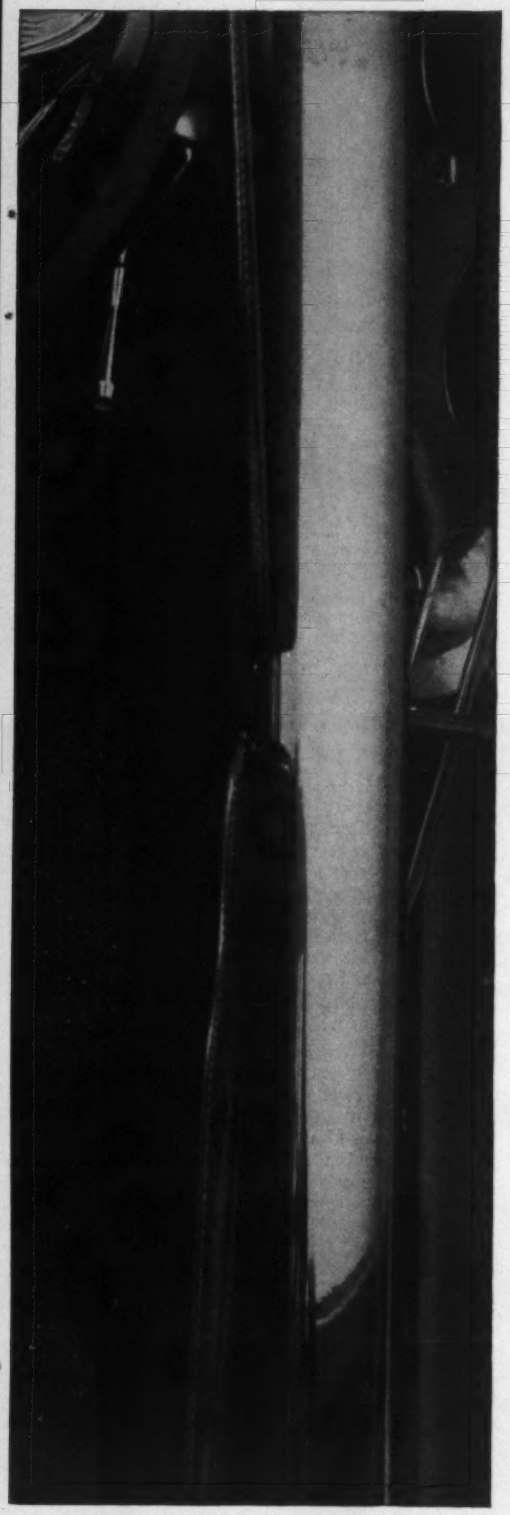
THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York 5, N.Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER



CHILTON'S MARKETING



How Chilton's M-A-P charts your MOST PROFITABLE sales territories

It's taken for granted that the best way to chart a salesman's territory is to start with reliable data. For years Chilton has been useful in this area. Today it offers broader and more penetrating marketing research than ever before. It is embodied in M-A-P, Chilton's Marketing Assistance Program.

Before you make any revisions in sales territories, we suggest you investigate the scope of Chilton's M-A-P. You will find professional fact-finders and the most efficient tools of research. You will have access to reservoirs of information. You will get the latest studies of buying influences; opportunities for new products; fast-moving market trends; ideas to make your sales and advertising more effective.

Chilton's 17 business publications add to the depth and breadth of M-A-P. Each has a wealth of timely facts acquired through years of experience. Chilton's standards of editorial excellence are now linked with stronger and more complete marketing tools for advertisers. A Chilton representative will be glad to give you more information. Or write for this book, which describes the program in detail.

Chilton
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Publisher of: Department Store Economist • The Iron Age • Hardware Age • The Spectator Automotive Industries • Boot and Shoe Recorder • Gas • Commercial Car Journal Motor Age • Butane-Propane News • Electronic Industries • Jewelers' Circular-Keystone Optical Journal • Hardware World • Aircraft & Missiles • Product Design & Development Distribution Age • Chilton Research Services • Business, Technical and Educational Books

ASSISTANCE PROGRAM

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 131.

Internal Grinding

A booklet on internal grinding wheels describes the features of these wheels. Included in the brochure also, is a table of suggested gradings for internal-grinding operations and several helpful rules of thumb to be kept in mind. (Cincinnati Milling Machine Co.)

For free copy circle No. 1 on postcard, p. 131

Vibration Control

Six-page catalog gives all the latest data on stopping vibration, shock and noise transmission by using steel spring machinery mountings. The bulletin explains clearly the superiority of steel springs in controlling vibration and shock. (Korfund Co., Inc.)

For free copy circle No. 2 on postcard, p. 131

Alloys

Detailed information on alloys for abrasion, impact, corrosion and heat-resisting services is contained in a series of data sheets. Each sheet provides complete engineering data on a single alloy. (Coast Metals, Inc.)

For free copy circle No. 3 on postcard, p. 131

Disk Grinders

High-production, precision disk grinders are illustrated and described in an eight-page catalog. Both horizontal and vertical machines are shown, with dimensions and specifications listed for each model. (Besly-Welles Corp.)

For free copy circle No. 4 on postcard, p. 131

Air Presses

Precision-built, single-acting air presses are fully described and illustrated in a four-page bulletin. The new line is built around four basic press sizes ranging from ½- to 2-ton capacities at 85 psi. (Niagara Machine & Tool Works)

For free copy circle No. 5 on postcard, p. 131

X-Ray

Spanning the years from 1930 to 1960, a 20-page list of references gives authors and publication names, article titles and publication dates for 376 papers on X-ray analysis subjects. (Philips Electronic Instruments)

For free copy circle No. 6 on postcard, p. 131

Gear Honing

Described and illustrated in a four-page brochure are the honing principle and a gear honing machine. A table lists production data for present industry gear-tooth honing applications. (National Broach & Machine Co.)

For free copy circle No. 7 on postcard, p. 131

Casting Technique

Of compelling interest, a 56-page brochure describes a precision casting technique. The process is a method for producing large metallic products, with higher strength and closer dimensional tolerances than previously available with any other foundry process. (Shaw Process Development Corp.)

For free copy circle No. 8 on postcard, p. 131

consistent quality

Consistent Quality stainless steel takes the guesswork out of any production operation. Tooling set-ups become standard. Rejects and reworking are reduced. Your plant and your product move smoothly.

J&L consistent quality stainless steel is as near as your telephone . . .

Call Western Union by number, ask for Operator 25

Western Union Operator 25 will give you the name of your nearest J&L stainless steel distributor. You'll find that he can further reduce your costs of using stainless steel by providing a complete selection of materials. He can save you the capital investment required to maintain long term inventories. He can provide a wide variety of preproduction services, and reduce your overhead for stocking, handling, accounting and obsolescence.

Your J&L distributor can provide you with the consistent quality stainless steel you need, *as you need it, when you need it.* He can serve you better because *J&L serves him better.* J&L's own staff of technical specialists and metallurgists are at the call of your J&L distributor to give you the technical assistance, even advanced research, you may need.

For better production and better service, call your J&L distributor—call Western Union Operator 25, today.

J&L—a leading producer of stainless steel and precision cold rolled strip steels.

J&L STAINLESS

SHEET • STRIP • BAR • WIRE

Call Western Union by number—ask for Operator 25
for the nearest source of Consistent Quality J&L Stainless Steel

Jones & Laughlin Steel Corporation · STAINLESS and STRIP DIVISION · DETROIT 34

AUTOMATIC UPSETTING!

Let National Tong-Feed Forging Machines Produce *Your* Forgings at Lower Cost

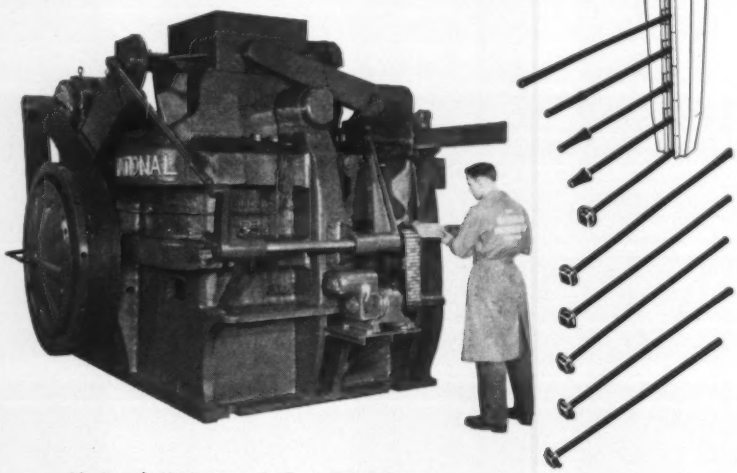
Hot Forging is going automatic!

Well, not *all* of it, but many forward-looking forge plants are taking a fresh look.

For example, all of the upset-type forgings above were made on National Automatic Tong-Feed Forging Machines. Seven sizes are now proved and presently operating in production: 1″, 1½″, 2″, 3″, 4″, 6″ and 7½″.

The method offers extremely interesting opportunities of raising production while reducing labor and operating costs. May we help you investigate?

Let's start by looking over your jobs, preferably here in Tiffin. Here we can have a productive session devoted entirely to your plans, but without obligation.



National 4″ Automatic Tong-Feed Forging Machine with discharge conveyor.

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U. S. A.

HARTFORD DETROIT CHICAGO

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Strapping Tools

Powered steel strapping tools is the subject of a 16-page booklet. Illustrations show how powered tools have increased packaging speed, reduced operator fatigue and produced more secure packages for dozens of users. (Acme Steel Co.)

For free copy circle No. 9 on postcard

Springs

A comprehensive brochure covers the manufacture of a wide variety of springs for use in industry. It contains formulas, drawings, data and illustrations for all types of hot- and cold-wound springs. (Alco Products, Inc.)

For free copy circle No. 10 on postcard

DC Power

Features, operation and applications for custom-built dc power supplies are listed in a 12-page bulletin. Computers, aircraft, missiles, military and special applications can use these units. The publication includes photographs, and load current graphs. (General Electric Co.)

For free copy circle No. 11 on postcard

Leveling Screws

Complete dimensional information on leveling screws, as well as many actual applications, is given in a new six-page folder. (The Ohio Nut and Bolt Co.)

For free copy circle No. 12 on postcard

Automatic Sampler

Describing a re-designed automatic sampler, an eight-page catalog reports in detail the new operating mechanism of the sampler. It also includes typical arrangements for both wet and dry processes. The sampler takes periodic samples from a stream of moving material. (Hardinge Co., Inc.)

For free copy circle No. 13 on postcard

Shaped Wire

Facilities for providing wire of various analyses, preshaped to a desired cross-section, are covered in a 16-page catalog. The catalog also contains helpful information on methods of calculating areas of common shapes. (American Chain & Cable Co., Inc.)

For free copy circle No. 14 on postcard

Flooring and Stair Tread

Steel and aluminum flooring and stair tread are illustrated and described in a 12-page bulletin. Both solid and open types are covered. Plate and panel sizes, tables of safe loads, and design, specification and installation data complete the information. (Joseph T. Ryerson & Son, Inc.)

For free copy circle No. 15 on postcard

Industrial Insulations

A four page brochure lists all types of the company's industrial insulations and insulating cements for use in power, chemical, petroleum, petrochemical and manufacturing industries. (Philip Carey Mfg. Co.)

For free copy circle No. 16 on postcard

Pyrometers

A six-page data sheet describes a line of pyrometers for temperature measurements up to 7600°F or 4200°C in plant or laboratory. This sheet describes and illustrates the construction and operation of the potentiometer-type optical pyrometer. (Leeds & Northrup Co.)

For free copy circle No. 17 on postcard

Recuperators

The importance of using fintubular construction, in metallic recuperators, to obtain longer life with less maintenance, is fully explained in an eight-page, two-color booklet. This brochure explains what fins do and how they benefit the user by obtaining longer recuperator life, greater over-tempera-

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FREE LITERATURE

ture protection, more air preheat in less space at reduced cost, and reduced maintenance. (Brown Thermal Products Corp.)

For free copy circle No. 18 on postcard

Mechanical Seals

The engineering and application of compact, ready-to-install mechanical seals are described in a bulletin. It is well illustrated with sectioned and lined drawings. (Garlock Inc.)

For free copy circle No. 19 on postcard

Coatings Selector

Mountable for ready reference, a guide to the selection of specialty coatings for application on plastics, metals, glass and wood is in chart form. The charts show the uses and characteristics of the company's spray, dip and flow coating materials, vacuum-metallizing coatings and standard plastisol formulations. (Bee Chemical Co.)

For free copy circle No. 20 on postcard

Applies Coatings

Airless hydraulic spray equipment and accessories are described in a bulletin. Any of the units can be used for industrial maintenance or production painting. (Lincoln Engineering Co.)

For free copy circle No. 21 on postcard

Flexible Tubing

New methods for handling air, liquids and light solids with nonmetallic flexible tubing, are stated in a manual. The manual provides a full description of the varied forms, major advantages and uses of flexible tubing. (Flexible Tubing Corp.)

For free copy circle No. 22 on postcard

Plastic Parts

Describing its extensive fabricating facilities, an eight-page brochure gives eight specific reasons, plus additional information, why the fabricating facilities of the manufacturer are used by most of the firm's customers, so that the laminates they purchase are delivered ready for use. The brochure points out that laminated plastic parts are available in any quantity and in any size. (Synthane Corp.)

For free copy circle No. 23 on postcard

Finishing Media

A four-page bulletin contains specifications on all company media and compounds for barrel finishing and vibratory finishing. (Lord Chemical Corp.)

For free copy circle No. 24 on postcard

Casting Technique

Describing an investment casting technique, a brochure gives advantages this new method has over conventional method. (Engineered Precision Casting)

For free copy circle No. 25 on postcard

Storage Racks

A 28-page booklet and a four-page supplement praise the virtues of quality-engineered racking. This literature points out the weaknesses of buying racking not designed to adequately sustain specific loads, and the economic and safety reasons for buying quality engineered racking. (The Paltier Corp.)

For free copy circle No. 26 on postcard

Jig Borers

In the form of a four-page folder, a check list gives ten vital factors to be considered by prospective purchasers of jig borers. The list helps simplify the ordinarily complex job of evaluating this type of equipment. The check list describes with photos and drawings important attributes of a good jig borer.

For free copy circle No. 27 on postcard

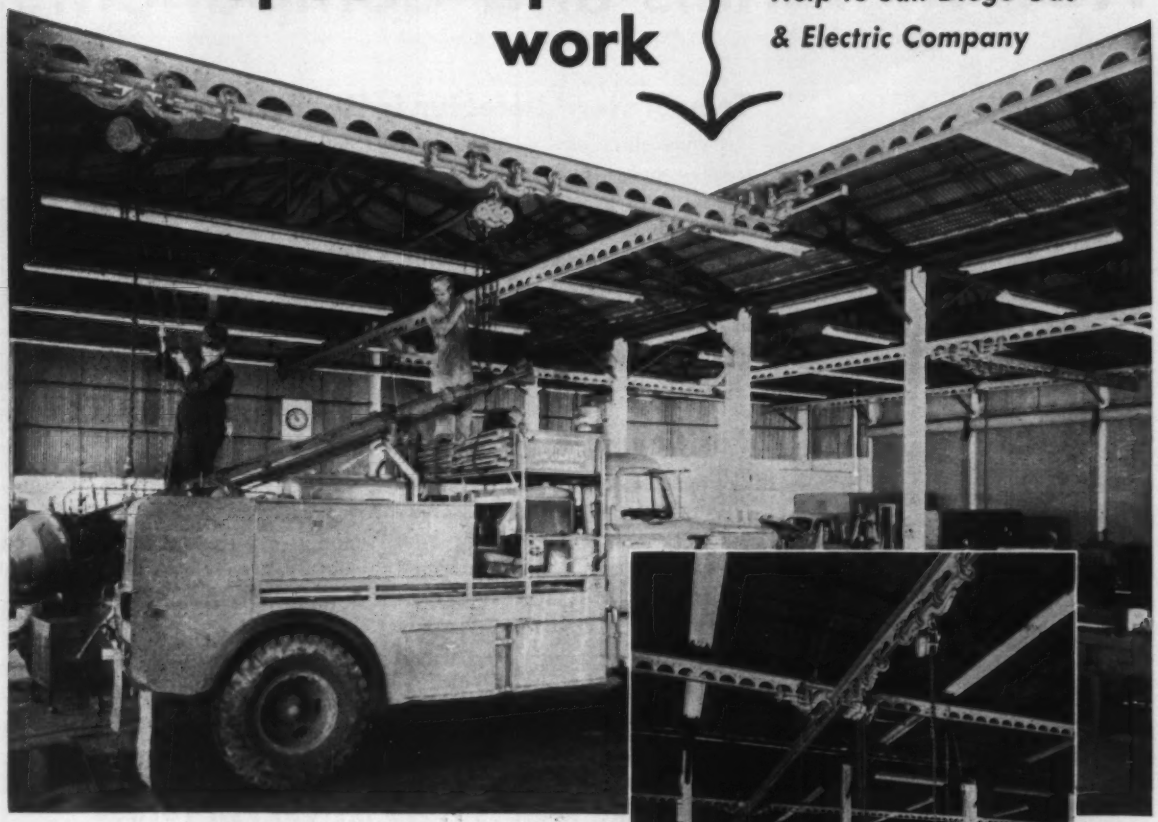
Speed Reducers

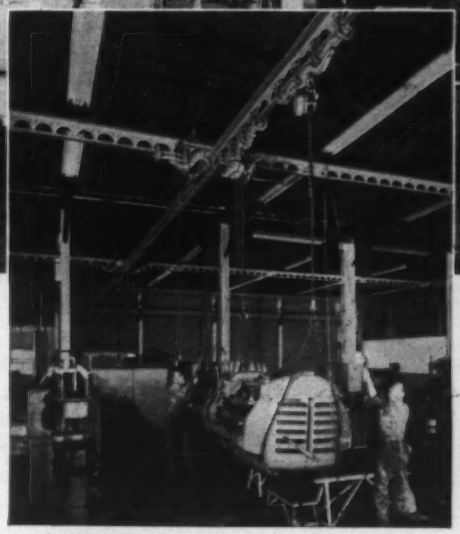
Sixteen pages in length, a two-color catalog covers complete information on horizontal, motorized differential speed reducers. This piece of literature contains engineering data, mounting information, service factors, horsepower, torque and overhung load ratings for the seven models in the series. (Winsmith, Inc.)

For free copy circle No. 28 on postcard

Hand Propelled Cranes Speed Repair work

Tramrail Transfer Crane System Great Help to San Diego Gas & Electric Company





Lowering a power-driven post hole auger onto a line construction truck. The handy Tramrail cranes are always close at hand ready to handle jobs like this quickly. The entire Tramrail system has a rated capacity of two tons.

Hoisting a heavy air compressor. The crane is shown interlocked with a spur track. At the other end of spur track is another crane in interlocked position. If desired, the compressor can be moved directly to the far crane, thus eliminating rehandling.

HEAVY lifts are made quickly and easily with minimum man-minutes of labor in the Repair Shop of San Diego Gas & Electric Company, San Diego, Calif., by means of a Cleveland Tramrail hand-propelled transfer crane system that covers and connects the working areas.

Because of Cleveland Tramrail's design, which provides unusually smooth, easy rolling action, hand-propelled equipment has proven satisfactory for most repair shop requirements. Of importance, too, hand-propelled cranes are low in original cost, simple to install and cost practically nothing to maintain. If it is found desirable at any time to have electric hoists and motorize bridge and carrier motions, this can be done with nearly all Cleveland Tramrail hand-propelled systems.

Whatever equipment your materials handling situation requires — hand-propelled — electrified in whole or part — automatic — Cleveland Tramrail engineers stand ready to serve you.

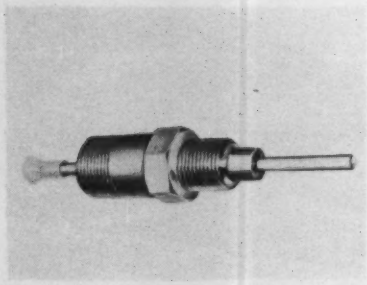
CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

Write for Booklet 2008

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4840 E. 290 ST. • WICKLIFFE, OHIO

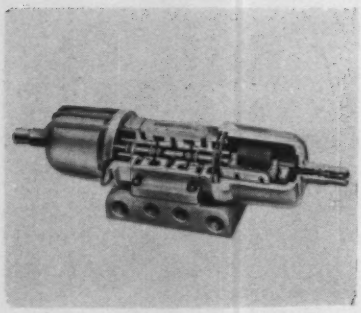
New Materials and Components



Temperature Detector is Hermetically Sealed

Explosion-proof, a tip-sensitive resistance temperature detector measures the bearings of machinery in hazardous atmospheres. The detector can be supplied with a spring-loaded holder to press its tip firmly against the bearing. The sensing element is located in the tip of the detector. The detector may be mounted in thermowells also for measuring liquid temperatures. Ordinary copper wire connects the detector to indicators or recorders. The temperature detector comes in lengths up to 10 ft. (Thomas A. Edison Industries)

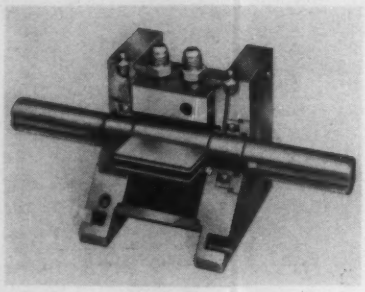
For more data circle No. 29 on postcard, p. 131



Positioning Air Valve Permits "Inching"

Simple and compact, a three-position four-way air valve is solenoid operated. The valve inches an air-actuated device to any desired position and hold. The valve contains only three working parts, spool and positive centering spring-loaded sleeves. Available in either closed-center or open-center design, the valves operate at working pressures from vacuum to 150 psi. The ⅜-in. port size valve utilizes a pre-wired body and base with a plug-in feature that allows the valve body to be removed without disturbing any electrical wiring. (Mechanical Air Controls, Inc.)

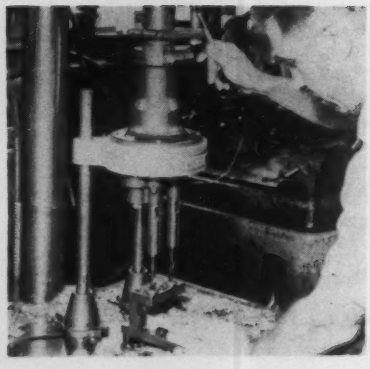
For more data circle No. 30 on postcard, p. 131



Oscillating Motors Have Instant Full Torque

Providing long, trouble-free service, a line of pneumatic and hydraulic oscillating motors produces torques from 100-430,000 in. lb. The heavy-duty line is built for 2000-psi operation with a wide safety factor. Heads are machined from cold drawn steel; bodies from mechanical seamless steel tubing. To provide greater strength, shafts are made from stress-relieved steel. Internal surfaces are hard chrome plated to insure maximum wear life and prevent rust and corrosion. Some of the motor's uses are for: clamping, indexing, camming, and locking. Roto-Tork Mfg. Co.)

For more data circle No. 31 on postcard, p. 131



Tool Withstands Wear of High-Production Work

A heavy-duty, adjustable, multiple-spindle drill head handles up to and including ⅝-in. drills in steel. The drill head quickly attaches to any drill press. Its adjustable spindles permit drilling or tapping a wide variety of hole patterns on a 6¼-in. diam circle. Heat-treated chrome-moly steel shafts, gears, and spindles, plus 100-pct ball bearing construction, make the unit a heavy-duty tool. Built-in speed reduction of the drill head permits its use on smaller drill presses to do large diameter multiple-hole drilling or tapping. Accessory guide rods provide maximum vertical travel stability for the unit to insure precision work. The drill head comes in 2-, 3-, or 4-spindle models. (Commander Mfg. Co.)

For more data circle No. 32 on postcard, p. 131

Fast Delivery

Quality

SIMONDS
INDUSTRIAL
CUT GEARS

★ FINISHED GEARS
★ CUSTOM GEAR CUTTING
★ HEAT-TREATED, CASE OR FLAME-HARDENED

You are sure of quality and prompt service when you place your industrial cut gear requirements with SIMONDS GEAR. We produce the full range of sizes in the types and materials you need from your blanks or ours. Let us quote on your next gear requirements.

* * *

Stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS • WORM GEARS
RACKS • PINIONS
Cast or forged steel, gray iron, bronze, Mechanite, rawhide or bakelite

MEMBER OF AGMA

THE SIMONDS GEAR & MFG. CO.
LIBERTY at 25TH PITTSBURGH 22, PA.

Quality Gears for over 65 years

Molded Nylon Pulleys

Variable-pitch pulleys include sizes for ¼-, ⅜- and ½-in. top-width V-belts used in drive assemblies and control equipment. The pulleys give adjustable speed control within a range of 2.45 to 1.

Pulleys are spring-loaded to maintain required belt tension. Molded of nylon-impregnated fiberglass, the pulleys have extreme chemical and corrosion resistance. All are self-lubricating. (Rampe Mfg. Co.)

For more data circle No. 33 on postcard, p. 131

Motor Protector

The design of an automatic-reset circuit breaker or overload relay achieves pin-point accuracy. A coordination of bimetal element, heater coil, and infinite contact adjustment guarantees precise calibration. The device will respond to rising temperature and excessive current draw of the motor. It can be built into the motor or used remote, attached either to the motor surface, or mounted elsewhere. (E-T-A Products Co. of America)

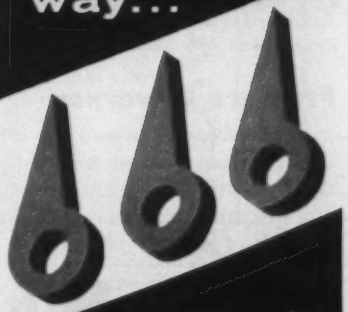
For more data circle No. 34 on postcard, p. 131

Shakeouts

Large, heavy-duty shakeouts, for large jobbing foundries, are equipped with large vibrator mechanisms. These mechanisms permit

the construction of shakeouts up to 18 x 20 ft in size and 150 tons in capacity. These shakeouts reduce the amount of mechanical and drive

"the HITCHINER way..."



cut costs two-thirds by INVESTMENT CASTING

These roller mounts, used on a precision skin-grafting machine, guide rollers which regulate the depth of the skin graft. The material used must withstand the high temperature of sterilizing and the corrosive elements of human blood.

The user of these stainless steel roller mounts once thought they could only be made by machining of stainless steel bar stock. Hitchiner's "Engineered Quotation" showed they could be investment cast, not only in the necessary alloy and without design changes, but with considerable savings.

The use of investment casting meant five times greater production without highly-skilled labor, a one-per-thousand reject rate, and a per unit cost of a third that of machined parts.

This wide freedom of choice in alloy, as well as flexibility in design may help you with your parts manufacturing problems. Try "the Hitchiner way" yourself and send us a sample or blueprint for our "engineered quotation" — no obligation.

Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure on the latest investment casting methods.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 25, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

components to be maintained and eliminate most of the operating problems of multiple units. (Hewitt-Robins, Inc.)

For more data circle No. 35 on postcard, p. 131

Pressure Governor

Completely redesigned, a pressure governor is used for applications requiring a closely-controlled pressure range in liquid or gas systems. It provides greater accuracy, sensitivity and a longer life than previous models when used to control motor-driven pumps, air compressors or similar devices. (General Electric Co.)

For more data circle No. 36 on postcard, p. 131

Hydraulic Feed Unit

For simplified control of complex machining operations, a hydraulic feed unit operates independently, or in conjunction with other hydraulic equipment. Pressure - compensated feed valves permit a flexible range of operational cycles. Due to the fine adjustment possible, the unit can be used in a variety of production operations including reaming, counter-boring, grooving, tapping and other applications that require an even feed in any part of the stroke. (Enterprise Machine-Parts Corp.)

For more data circle No. 37 on postcard, p. 131

Press Button

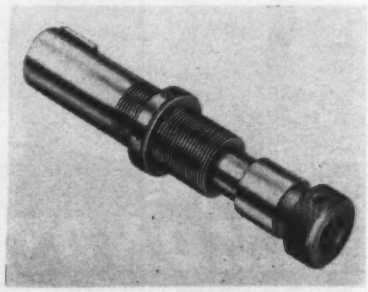
For stamping presses, a palm-operated press button mounts in a machine cavity or in its own oil-tight enclosure. The press button has heavy-wall diecast construction to take the most rugged service.

The pushbutton surface (over 7½ square inches) is extra-thick to provide long life, despite abrasive contact with work gloves. Button travel is only ¼ in. (Square D Co.)

For more data circle No. 38 on postcard, p. 131

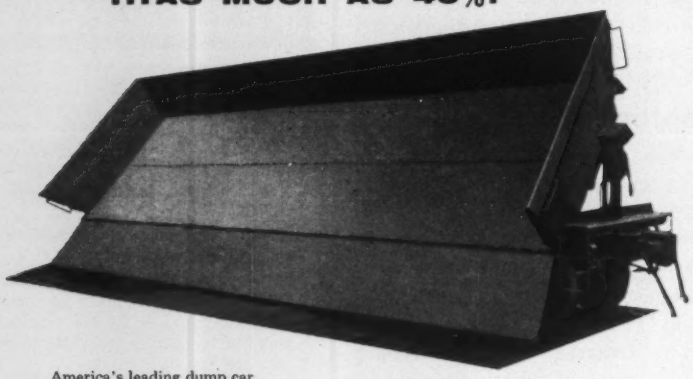
Tap Driver

Primarily for use on multiple-spindle machines which take adjustable - adapter shank tools, a double-action tap driver compensates for a difference in the feed of the spindle and the lead of the tap. It can be used both as a ten-



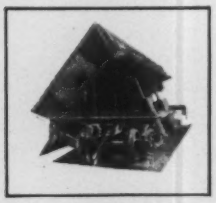
HOW MAGOR CARS CUT HANDLING COSTS

...AS MUCH AS 40%!



America's leading dump car
Fast • Efficient • Economical

Magor Air Dump Cars are designed to provide safe, swift automatic dumping. Automatic operation eliminates expensive labor and crane equipment. Perfectly smooth interiors permit complete dumping—prevent "dead load" returns. Low height and large open body speeds loading, saves time and haulage costs. The larger load means fewer trips!



The combined savings can cut your handling costs by as much as 40%!

See for yourself why Magor leads in the production and sale of these special cars. Write today for a free copy of a folder describing in detail the money saving features and dependability of Magor Air Dump Cars.

Safe, side dumping action takes less than a minute.

MAGOR

CAR CORPORATION

50 CHURCH ST., NEW YORK 7, N. Y.

sion- and a compression - type driver. The tension feature is used when the spindle feed is less than the lead of the tap. The compression feature is used when the spindle feed is greater than the lead of the tap. (Seibert & Sons, Inc.)

For more data circle No. 39 on postcard, p. 131

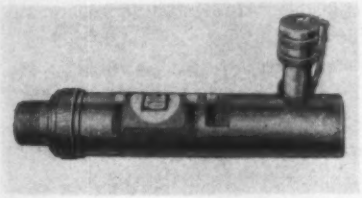
Pivoting Shelf

The "where to put it" problem of machine operators is solved with a 16-gage steel pivoting shelf. It easily attaches to the column of a drill press or on the side of the base of other machines such as lathes, millers, grinders, and saws. Installed within easy reach of the machine operator, the tray will hold up to 50 lb of parts, tools, oil cans, and other articles. (E. V. Nielsen Inc.)

For more data circle No. 40 on postcard, p. 131

Hydraulic Rams

Single-cylinder, single-acting hydraulic rams have capacities from 2-50 tons, with maximum working pressures of 8650—10,000 psi. The



rams are compact and lightweight. They have individually - treated packings, insuring high sealing efficiency. (Owatonna Tool Co.)

For more data circle No. 41 on postcard, p. 131

Power Driver

A screwdriver attachment, with friction clutch for control of power and safety, converts any ¼-in. electric drill to a portable power screwdriver. It drives screws fast and to uniform depth, can be coupled directly to any ¼-in. drill spindle or (with universal shank adapter) to chuck of any ¼-in. and larger power drill. Bronze bearings are pre-lubricated for carefree operation. The attachment comes with a ¼-in. shank adapter. (Stanley Tools, div. of The Stanley Works)

For more data circle No. 42 on postcard, p. 131

. . . of Duraloy HH Alloy, one of the most widely used high chrome, medium nickel alloys.

20-FOOT FURNACE ROLLS
Centrifugally Cast

Two items concerning these furnace rolls may be of particular interest:

a—the size: 20 feet long—14" OD, ¾" wall thickness

b—welding operations by which reducing cones and shafts (both statically cast of the same alloy) were welded to the centrifugally cast rolls

These two items will serve to emphasize two phases of our service: (1) the large size centrifugally cast tubes we are able to produce and (2) our machining and finishing facilities, including welding.

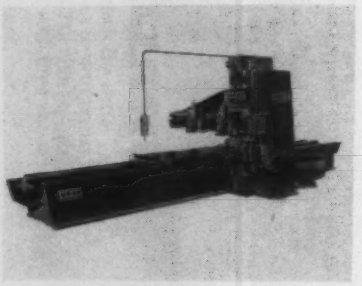
Our new 16-page general Bulletin—G-159—gives complete details. Would you like a copy? When writing or calling would you mind telling us the general nature of your high alloy casting requirements? Better yet, if you have specific requirements on which we could help, let us have the details.

DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

DURASPUN

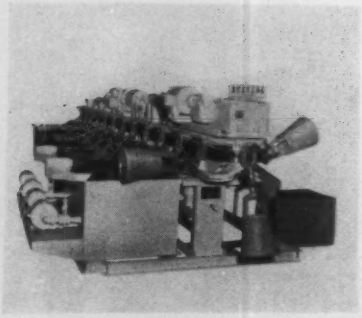
New Equipment and Machinery



Planer Features Hydraulic Infinite Feed Range

Designed for fast carbide planing, a small openside planer cuts both ways. The planer has a control station which facilitates the rapid positioning of saddles, slides or rail. The station permits an infinite saddle feed from 0-½ in. A 60- to 75-hp variable-voltage drive powers the planer. The planer ratio is 6:1, and the motor is adjusted in the cut and return direction from 180-1800 rpm. The planer is ideal for normal machine-shop use, or practically any other industry where a small planer is needed. (The G. A. Gray Co.)

For more data circle No. 46 on postcard, p. 131



Plating Machine Offers Mechanical Flexibility

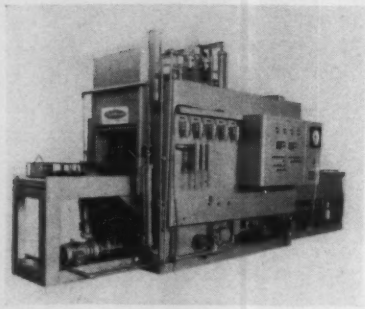
Measuring only 4-ft high and 6-ft wide, an automatic barrel machine plates and processes small parts. The machine provides automatic load, unload and cycling features. It incorporates into integrated process manufacturing and quickly adapts to meet most processing requirements. A selective "skip track" feature permits elimination or addition of any processing step by simple mechanical adjustment. The complete operating mechanism, as well as the solution tanks and barrels, are easily accessible to the operator at all times from the plant floor level. The unit is inexpensive to install and maintain. (Frederic B. Stevens, Inc.)

For more data circle No. 47 on postcard, p. 131

Cut-Machining Units Do Tool-Reclamation Work

Simply constructed, a cutting unit reclaims cutting tools. It clean cuts on the hardest high-speed tool steels of all kinds. The operator can slice through the hardest materials, cutting with a simple chopping action for smaller tools. The unit's fast-acting work holding device permits quick switching from one job to another. Jobs formerly requiring minutes to do can be done in seconds with this cutting machine; while in operation, sediment or sludge is trapped in two stages with the separate coolant pumping system. Fourteen-in. wheels are used to reduce the number of wheel changes. (Wallace Supplies Mfg. Co.)

For more data circle No. 48 on postcard, p. 131



Furnace's Automatic Control Reduces Human Error

Atmosphere controlled, a furnace is equally effective as a multi-purpose furnace in a heat-treating department or for processing in a continuous production line. It can be used for carburizing, carbonitriding, carbon restoration, normalizing, annealing and hardening up to 1850°F. The unit can be built with work-space dimensions up to 32-in. wide x 50-in. long x 26-in. high. It can accommodate up to 1500 lb of work in any one load. Automatic operation makes the loading of the furnace easy, fast and safe. No moving parts of the work transfer system are exposed to excessive heat in the furnace. (Sunbeam Equipment Corp.)

For more data circle No. 49 on postcard, p. 131

NEW EQUIPMENT

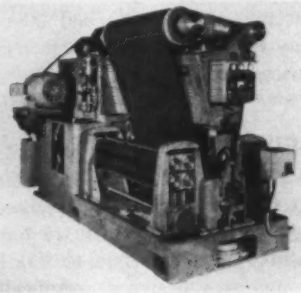
Epoxy Adhesive

An epoxy adhesive has a tensile shear of 2200 psi at 300°F on aluminum to aluminum. A smooth, thixotropic, 100-pct solids paste, it will not flow during cure—even when applied to vertical surfaces. It is ideally suited for bonding porous surfaces; also recommended for bonding metal, plastics, ceramics, glass and wood. (Hysol Corp.)

For more data circle No. 50 on postcard, p. 131

Abrasive Belt Grinder

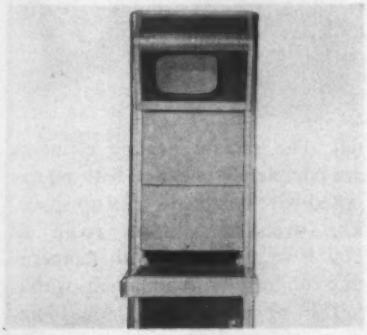
Size control, fine finish, and high production all are combined in a three-roll abrasive belt-grinding and polishing machine. The grinder is designed to provide compactness needed today for in-line installations (such as for coil grinding) without loss of rigidity, cutting qualities, or power needed for production of accurate, fine-finish work. (Mattison Machine Works)



For more data circle No. 51 on postcard, p. 131

Visual Communications

A closed-circuit television transmitter produces a sharp, intense, high-resolution image without using camera or lighting equipment. The transmitter insures instant accurate visual communication with as many as 500 locations at the same time. The transmitter will find its applications in all phases of business and industry where there exists a need for visual communication apparatus designed for the transmission of static information. (Television Utilities Corp.)



For more data circle No. 52 on postcard, p. 131

Tensioner

With self-energized feed wheel that holds high tension, a manual action strapping tool takes strapping directly from the coil. It saves a foot or more of strap every time it is used. Any type seal can be used and the seals can be placed either in front or behind the tensioner. Light

PETE, YOU PRETZEL-BENDER-TURNED-DESIGNER, YOUR NEW PART WILL NEED AT LEAST 158 SEPARATE MACHINING STEPS!
NEVER FEAR, POINDEXTER, ARWOOD WILL INVESTMENT CAST IT AND ALL WE'LL NEED IS A COUPLE OF GRINDS.

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weight and easy to use, it weighs only 6-lb. (Signode Steel Strapping Co.)

For more data circle No. 53 on postcard, p. 131

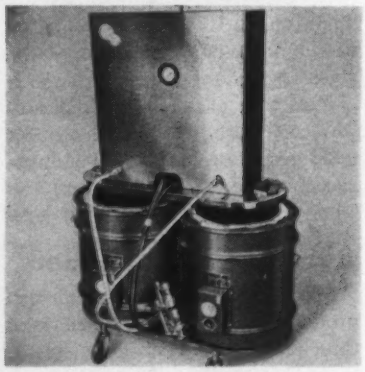
High-Speed Lathe

A 16-in. lathe is designed specifically for high - speed turning, facing, and boring operations. Controls, feeds and speeds, and principles of design all are predicated on specialization—the machine has no gearbox or threading equipment. Operators require less skill and can turn out more and better work because a minimum of technique is required to operate the lathe. Speeds and feeds can be changed at any time simply by turning dials on the headstock. (Barber-Colman Co.)

For more data circle No. 54 on postcard, p. 131

Applies Compounds

Completely portable, a production machine accurately meters a wide range of two-part compounds 0-20,000 cps viscosity, 5 parts per hundred to 50-50 epoxies, polyurethanes, polyesters, and foam. Top-quality gun sprays or flows thoroughly mixed materials yet can

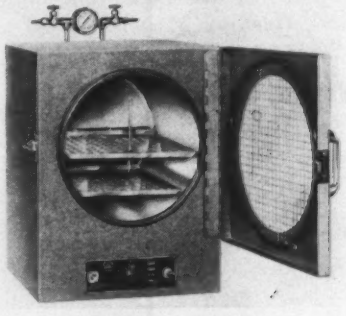


be purged and cleaned in minutes. Features of the equipment include high-volume capacity, internal mix, adjustable spray range and adaptability to 55-gal drums. (Pyles Industries, Inc.)

For more data circle No. 55 on postcard, p. 131

Vacuum Oven

Within an 11-in. diam x 12-in. deep stainless-steel vacuum chamber, a laboratory oven has a temperature range from room to 500°F. The unit was designed specifically for processing and testing electronic components where high temperatures under vacuum often are essen-



tial. The radiant heating elements are completely enclosed with no exposed-wire heaters to take up space. The oven heats from room to 500°F in one hour, with temperature uniformity maintained within ±1°F at all settings. An 11-in. diam safety-glass window in the door permits 100-pct view of contents. (Labline, Inc.)

For more data circle No. 56 on postcard, p. 131

Where can you use this better-than-3300°F oil- or gas-fired flame?

The revolutionary Bliss Pulsation Burner

produces temperatures never before achieved with oil or natural gas. Burning oil, it can reach a searing 3450°F. On 1000 BTU/cu. ft. natural gas, it develops 3320°F. Both these extremely high temperatures are close to the theoretical limits for these two fuels. Foundries, smelters, heat treaters and other metal processers have been quick to take advantage of the remarkable combustion efficiency of these new burners. To them, it has meant faster heating cycles, cleaner flue gases, and above all, fuel economy that cuts from 12% to 30% from their furnace overhead. Not to speak of reduced maintenance on refractory linings.

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The Iron Age Summary

Signs of Upturn Begin to Show

The rate of incoming orders indicates that an upturn in steel operations is on the way.

But it won't really become apparent until September, and it may be smaller than expected.

■ The first faint traces of activity leading to an upturn in steel operations are beginning to show. At the same time, there are indications that the fall upturn may not be as strong as expected earlier.

However, everything now points to the hoped-for turnaround in operations.

Incoming orders are coming out of the slump they entered two months ago. For the first time since 1958 incoming business just about matches steel output. And within the next few weeks the tonnages should be bigger and the orders more numerous.

Volatile Situation — Orders for August delivery of steel have shown little or no improvement over July. Before this, backlogs allowed steel mills to operate above the incoming rate. Now, backlogs are virtually nonexistant.

This means mill operating rates will be quite volatile if incoming business continues to fluctuate from week to week. In fact, it is very possible that the steel operating rate will show a drop at the same time orders are rising.

Need Orders Now — However, steelmakers are trying to minimize this possibility. For the past few weeks, mills have been pressuring customers to place orders now.

Their argument: Unless mills get enough orders to operate economically in August, they'll be forced to shut down — they're having a hard time keeping some equipment running until they can "bunch" a number of small orders. If shut downs come, service and prompt delivery would be out the window.

Bottoming Out — This pressure has resulted in more orders and better tonnages. But some of this is steel that normally would have been ordered later this month, or even in September and October. In effect, mills are borrowing from future business. Consequently, there is a growing belief that the October peak will be lower than expected.

Yet, it appears that the bottom in steel has been reached. While there won't be a sharp increase in steel output until after Labor Day, seasonal factors usually begin working in the first week in September.

The Outlook — Some industry sources say steel users are liquidating inventories at the rate of about 1.5 million tons a month. At this rate most of the 6 million tons added to stocks in the first half will be washed out by the end of August. Inventories will be down to the level reached at the start of 1959, and only a little above the level at the start of this year.

Even so, fourth quarter output is expected to average no more than 70 pct of industry capacity. September is expected to be below this level; October will top it. November should show a leveling off. December operations are a question mark. But the auto industry will supply the answer—later.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,570	1,520	1,203	317
Ingot Index				
(1947-1949=100)	97.7	94.6	74.9	19.7
Operating Rates				
North East Coast	61.0	61.0	50.0	15.0†
Buffalo	57.0	56.0*	48.0	0.0†
Pittsburgh	50.0	49.0*	35.0	27.0†
Youngstown	47.0	48.0*	13.0	10.0†
Cleveland	50.0	32.0*	42.0	0.0†
Detroit	79.0	80.0	70.0	24.0†
Chicago	57.0	56.0*	46.0	4.0†
Cincinnati	52.0	48.0	26.0	47.0†
St. Louis	54.0	41.0*	52.0	70.0†
South	61.0	62.0*	42.0	9.0†
West	49.0	51.0*	64.0	0.0†
U. S. Rate	55.1	53.3	42.2	11.2

*Revised †IRON AGE Estimate

Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$31.83	$31.50	$31.00	$39.83
No. 2 bundles	$21.50	$21.17	$20.83	$27.34
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	30.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	104.625	104.375	102.625	102.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Press Prices: Going Up or Down?

Press builders are looking for business. Their backlogs are shrinking rapidly.

They would like to raise prices. But the low volume of business could cause prices to hold steady or even soften a little.

■ The press industry backlog is shrinking.

Normally, this could be regarded as an indicator that prices will soften, and there is little need to order ahead. One press builder notes, for example, "We've virtually nothing on the books for the fourth quarter, or even the first quarter. The inquiries aren't firming into orders."

There are signs, nevertheless, that it might be worthwhile to check press builders if a press will be needed in a hurry during the next six months.

A Bad September? — Another press builder comments, "As far as price cuts go, I don't see how we can cut back. I think you're going to see a move in the other direction."

Does the present shrinking backlog indicate a bad September? Not necessarily. Most major press builders acknowledge that they are cutting down their backlog. This is being done in many shops operating on a 7-day week with extended work days. All of them expect a surge of new orders in September will extend the backlog.

Agricultural and earthmoving equipment makers are already boosting their press orders. Along with this has come a moderate increase in off-the-shelf items for the smaller companies.

An Automotive Move—It is expected that the automotive industry will move in after September. Press buying will be aimed at the 1962 models and a major revamping of fabricating lines. The latter is necessary to handle increased output of the compact cars.

Another factor worth watching is that inventories of stock models are comparatively low. One manufacturer indicates that a heavy influx of rush orders for special equipment has cut the manpower available for production of stock presses.

Tight money and an uncertain business outlook combined to edge these press makers into a low inventory position. This was in spite of business better than the general U. S. economy.

Unspent Capital—A final factor is the large amount of purchasing capital yet unspent. The money is still in corporate tjlls; is authorized for spending, and could hit all at once.

Certainly there has been no instance of press or press brake prices advancing in recent months. On the contrary, there were some soft price sales during the second quarter. But it's equally certain that there hasn't been a whisper of price increases this year.

Most buyers agree that management is closely watching company purse strings. If automotive lets go with a buying program, so will many non-related industries. And the indications are that a good portion of these funds will go into press purchases.

AUTOMOTIVE AID: Presses like this one used to manufacture auto body parts are expected to help prevent a slump in the press building industry. Press builders say there is little chance that press prices will drop this year. They may go up instead, some builders say.

15 years engineering and millions of dollars invested* to perfect the world's finest brake...today's PACIFIC HYDRAULIC PRESS BRAKE

Over 9 out of every 10 hydraulic press brakes in operation today are PACIFIC providing...

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- Tandem operation of press brakes for forming pieces 40 ft. or longer (1953)
- Tonnage control to protect light dies in heavy press (1953)
- Multiple hydraulic cushion cylinders for deep drawing (1954)
- Overhead integral power unit for increased accuracy (1955)
- Cylinder ram guides for increased rigidity (1956)
- Shearing attachment for shearing heavy plate on press brake (1958)
- Pipeless stacking of valves to eliminate pipe breakage and leakage (1959)
- Shockless hydraulic valving to eliminate cause of leakage (1959)

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Are Warehouse Stocks Too Low?

With sales slow, service centers are not anxious to build up stocks.

But mill suppliers wonder if the distributors may not be waiting too long.

■ Right now steel service centers are searching for orders. For many, the July seasonal lull will stretch over into this month.

The sales slump is reflected in orders warehouses are placing with their mill suppliers. Some plan to keep cutting inventories all through August. There are cases where distributors have booked less than half their normal September tonnage.

Unrealistic? — On some grades, warehouses have only a three-months supply of steel, contrasted with the usual four-month inventory.

On the basis of the present market, this is understandable. But for the long-run it might be unrealistic. And it is leaving mill suppliers confused.

The steelmakers wonder how much tonnage the service centers will want in September and October. Mill salesmen are pointing out to warehouse purchasers the prospect of a delivery jam-up, if demand improves.

Delivery Important—The argument runs this way: If warehouse sales pick up, even mildly, the distributors will get uneasy about September deliveries. They might push for rush deliveries from mills. This, in turn, would quickly boost mill delivery times from today's 1 to 3 weeks.

Meanwhile the warehouses are reluctant to book much steel for August-September delivery. And mills keep asking why.

Sheet and Strip—Mills are looking ahead to September for a real pickup in orders. At present, sheet is one of the better products in a very dull market. But, even so, many sheet mills don't expect August to show much improvement over July. An **East Coast** mill believes this month's bookings in sheet will about equal last month's. September tonnage is expected to be better, with October 10-15 pct over September.

Pittsburgh mills say the slow start on steel buying for '61 cars and summer vacations have pushed back the upswing. Right now, they report, galvanized is the most active among flat-rolled products. But it's described as "moving sideways." At **Cleveland,** sheet producers are starting to get some advance orders (for small tonnages) from appliance makers. **Chicago** and **Detroit** mills say releases from automakers are starting to come in.

Bar—Bar products remain among the weakest market areas. Users are slow to place orders, counting on getting rapid delivery. Bar mills at **Pittsburgh** say there is no spirited buying. In some cases, mills are shipping orders originally booked in May and June and then deferred. **Cleveland** area mills point out auto parts forgers and automakers haven't placed orders beyond September. Deliveries in as little as 24 hours are listed by **Chicago** producers. Buyers are shopping around, looking for price advantages.

Plates and Shapes—The market continues slow in most sections. **East Coast** mills can't find any reasons for encouragement about a pickup. Some mills there say the order intake is worse than in 1958. All types of plate carbon, alloy, and clad, are readily available. Buyers are depending on mills for rapid service. The situation is better in the **Midwest** for structurals. Service centers say sales have improved in light structurals. Mills report heavy structurals are "doing well."

Stainless — For non-automotive stainless products, the vacation lag will probably continue through this month. Plates are showing some gains. But sheets are weak. **Pittsburgh** mills are disappointed by August orders. But they expect some improvement in September. One mill there says July was the worst month for orders since 1953. "We're handling as much paperwork as before," the mill spokesman adds, "but the order quantities are smaller."

New Structural Steel—U. S. Steel Corp. now has available "a new and higher yield point structural carbon steel." With this new A36 steel, average savings of four to six pct in the weight of steel structures are promised. The A36 steel is available in structural shapes, plates and bars. It conforms to specification A36-60T for rolled structural steel recently approved by the American Society for Testing Materials.

PURCHASING AGENT'S CHECKLIST

Purchasing teamwork points way to lower costs, better profits—a Special Report. P. 71

Shell-mold process used for large steel castings. P. 112

Living ratios give formulas to gage capital evaluation. P. 114

COMPARISON OF PRICES

(Effective Aug. 2, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Aug. 2 1960	July 26 1960	July 5 1960	Aug. 4 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Aug. 2 1960	July 26 1960	July 5 1960	Aug. 4 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, South Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$30.50	$30.50	$30.50	$43.50
No. 1 steel, Phila. area	33.50	33.50	33.50	39.50
No. 1 steel, Chicago	31.50*	30.50	29.00	36.50
No. 1 bundles, Detroit	29.50*	27.50	27.50	37.50
Low phos., Youngstown	34.50	34.50	33.50	44.50
No. 1 mach'y cast, Pittsburgh	47.50	47.50**	48.50	52.50
No. 1 mach'y cast, Phila.	49.50	49.50	50.50	50.50
No. 1 mach'y cast, Chicago	46.50	46.50**	45.50	59.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$31.83*	$31.50	$31.00	$39.83
No. 2 bundles	21.50*	21.17	20.83	27.34
Coke, Connelsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	30.00
Copper, Lake, Conn.	33.00	33.00	33.00	30.00
Tin, Straits, N. Y.	104.625	104.375	102.625	102.00
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickle, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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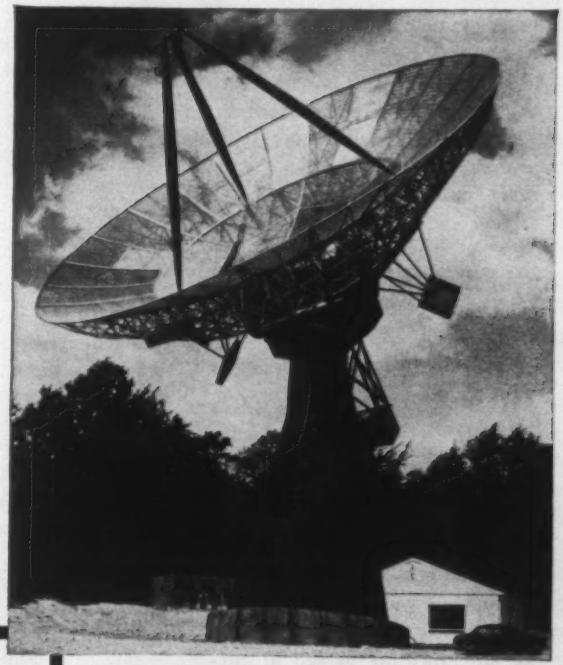
* Appears in the Aug. 4 - Aug. 18 issues.

One rpm per day



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Dependable Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

August Doesn't Look Promising

Earlier talk that August might be the start of the upswing is now hushed.

There are areas with some price increases, but the overall picture lends well to pessimism.

■ Any signs that August will be the month of upswing in the scrap market are well camouflaged.

While prices climbed some in several areas, the situation generally remains the same. One dealer summed it up as "very discouraging." Exports are continuing to sustain the market, but August commitments have already been made. There are some dealers claiming to "write off" this month already.

Chicago and Detroit are among the areas showing slight price increases. St. Louis, a leader in the upswing movement lately, slipped back into the lull. A report from Pittsburgh says that pressure is mounting for higher prices.

The South continues to hold its own. Scrap there is "moving fairly well" with the exception of the cast grades.

Pittsburgh—With industrial supply down and dealers anticipating a stronger market, pressure for higher prices is mounting. No. 1 factory bundles brought $2 more than last month on the automotive list. Tonnage was the smallest of the year. In the dealer market, yards are unwilling to sell at current prices. However, there is still not enough consumer demand to bring a general market advance. The biggest consumers in the district are out of the market.

Chicago—Prices moved upward sharply, following purchases of automotive bundles and purchases by mills of dealer grades. Foundry and electric furnace grades continue firm. Dealers are now general in reporting fairly low yard stocks, and are not anxious to sell. Industrial scrap generation continues to be somewhat lower than normal. At least a mild pickup in scrap collections is anticipated during the first weeks of August.

Philadelphia—Domestic business is at a standstill. Many dealers have written August off the books because exports are already commited. One dealer notes, "if local mills need scrap, they'll have to pay a higher price for it. Everything has been cleaned out with exports." Occasional cars have been sold in the local market but most dealers agree it's difficult to get an "honest" picture of the market.

New York—Prices and the general tone of the market are unchanged. Export is still the sole support of the market for steelmaking grades.

Detroit—August's industrial list brought price boosts of $2 to $3 on No. 1 bundles. An order by a local mill for No. 2 bundles brought just under $20 a ton on cars at broker's buying price. Decreased tonnage on the list was read as reasoning for the price increase.

Cleveland—The market took another bullish turn as area auto lists went up. With railroad lists next in line, dealers will probably get few orders. Any open orders would probably push dealer prices up slightly.

Cincinnati—Area mills are continuing July prices and don't care if they get shipments or not. Dealers are not eager to sell now, hoping for better prices later. The overall movement is about the lowest of the year in this area.

St. Louis—The market seems to have slipped back into its recent lull after a few weeks of firming tendencies. There is very little buying. Mills are still receiving more offers than they can handle or will accept.

Birmingham — An Atlanta mill, out of the market for some time, bought No. 2 heavy melting scrap this week. The purchase was made at $1 under its last purchase. A Birmingham electric furnace plans to buy this week at the present market quotations. Otherwise, scrap is moving fairly well with the exception of the cast grades. Most pipe foundries have filled present needs and are out of the market. Exports continue quiet.

Buffalo—It's a firm, but quiet, market in this area. Dealers are not expecting any radical change in prices or business. Domestic business remains very slow and not too steady.

Boston—There is very little activity in machine shop turnings. Nevertheless, limited exporting is still holding up. No domestic demands have been heard for weeks.

West Coast—Exporting continues to be the only life in this market. But even this is slowing down. Some dealers say that fewer cargoes will leave Los Angeles, San Francisco and Seattle during the next quarter.

Houston—One dealer summed it up as "very discouraging." Actually, the market remains about the same with no improvement in sight. It appears that August will follow in the footsteps of a very slow July.

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SCRAP PRICES *(Effective Aug. 2, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Low phos. punch'gs plate	37.00 to 38.00
Heavy turnings	27.00 to 28.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	50.00 to 51.00
RR specialties	49.00 to 50.00
No. 1 machinery cast.	47.00 to 48.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	85.00 to 90.00
430 bundles and solids	90.00 to 95.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	42.00 to 43.00
Low phos. punch'gs plate, ¼ in. and heavier	37.00 to 38.00
Low phos. 2 ft. and under	35.00 to 36.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	53.00 to 54.00
Rails 2 ft. and under	48.00 to 49.00
Angles and splice bars	43.00 to 44.00
RR steel car axles	47.00 to 50.00
RR couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	46.00 to 47.00
Cupola cast.	41.00 to 42.00
Cast iron wheels	32.00 to 33.00
Malleable	45.00 to 46.00
Stove plate	34.00 to 36.00
Steel car wheels	37.00 to 38.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	85.00 to 90.00
430 bundles and solids	85.00 to 90.00
430 turnings	40.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	23.00 to 24.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	27.00 to 28.00
RR specialties	39.00 to 40.00
Rails, 18 in. and under	51.00 to 52.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	37.00 to 38.00
Cast iron car wheels	40.00 to 41.00
Malleable	45.00 to 46.00
No. 1 machinery cast	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	22.50 to 23.50
No. 1 dealer bundles	26.50 to 27.50
No. 2 bundles	17.50 to 18.50
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	33.00 to 34.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	49.00 to 50.00
No. 1 cupola cast.	35.00 to 36.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$33.00 to 34.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	34.00 to 35.00

Cleveland

No. 1 hvy. melting	$29.50 to $30.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	29.50 to 30.50
No. 1 factory bundles	34.50 to 35.50
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.50 to 30.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft. & under	37.00 to 38.00
Drop forge flashings	29.50 to 30.50
Low phos. punch'gs plate	30.50 to 31.50
Foundry steel, 2 ft. & under	33.00 to 34.00
No. 1 RR hvy. melting	34.00 to 35.00
Rails 2 ft. and under	49.00 to 50.00
Rails 18 in. and under	50.00 to 51.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	50.00 to 51.00
Stove plate	39.00 to 40.00
Malleable	45.00 to 46.00
Stainless	
18-8 bundles	180.00 to 185.00
18-8 turnings	75.00 to 80.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	36.00 to 37.00
Structurals and plate, 2 ft and under	36.00 to 37.00
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft and under	47.00 to 48.00
No. 1 machinery cast.	45.00 to 46.00
No. 1 cupola cast.	40.00 to 41.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft.	31.00 to 32.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	20.00 to 21.00
No. 1 RR hvy. melting	32.00 to 33.00
Rails, random lengths	37.00 to 38.00
Rails, 18 in. and under	40.00 to 41.00
RR specialties	38.00 to 39.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	48.00 to 49.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft & under	32.00 to 33.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft.	35.00 to 36.00
No. 1 RR hvy. melting	28.00 to 29.00
Scrap rails, random lgth.	39.00 to 40.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	37.00 to 38.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	45.00 to 46.00
Cast iron car wheels	37.00 to 38.00
Unstripped motor blocks	34.00 to 35.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stainless	
18-8 prepared solids	165.00 to 170.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	26.00 to 27.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Heavy breakable cast.	30.00 to 31.00
Mixed cupola cast.	34.00 to 35.00
Automotive cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	60.00 to 65.00
430 bundles and solids	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $24.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 24.50
No. 2 bundles	14.00 to 15.00
No. 1 busheling	24.00 to 24.50
Machine shop turn.	5.00 to 6.00
Shoveling turnings	8.00 to 9.00
Clean cast. chem. borings	12.00 to 13.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	27.50 to 28.50

San Francisco

No. 1 hvy. melting		$34.00
No. 2 hvy. melting		30.00
No. 1 dealer bundles		30.00
No. 2 bundles		20.00
Machine shop turn.	$14.00 to	15.00
Cast iron borings	14.00 to	15.00
No. 1 cupola cast.		46.00

Los Angeles

No. 1 hvy. melting		$32.00
No. 2 hvy. melting		29.00
No. 1 dealer bundles		27.00
No. 2 bundles		17.00
Machine shop turn.		13.00
Shoveling turnings		15.00
Cast iron borings	$15.00 to	16.00
Elec. furnace 1 ft and under (foundry)	42.00 to	43.00
No. 1 cupola cast.	42.00 to	43.00

Seattle

No. 1 hvy. melting		$35.00
No. 2 hvy. melting		33.00
No. 2 bundles		22.00
No. 1 cupola cast.		36.00
Mixed yard cast.		36.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$25.80
No. 2 hvy. melting cut 3 ft. and under	22.50
No. 1 dealer bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bush., new fact., prep'd	25.50
Bush., New fact., unprep'd	20.45
Machine shop turn.	12.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting		$32.00
No. 2 hvy. melting		29.00
No. 2 bundles		18.00
Machine shop turn.		12.00
Shoveling turnings		14.00
Cut structural plate 2 ft & under	$40.00 to	41.00
Unstripped motor blocks	26.00 to	27.00
Cupola cast.	32.00 to	33.00
Heavy breakable cast.	25.00 to	26.00

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Reynolds Capturing Citrus Can Market

Aluminum cans for the citrus fruit juice industry are rapidly replacing tinplate.

And, according to Reynolds Metals Co., this may only be a starter for a much wider use of the lightweight cans.

■ Reynolds Metals Co.'s campaign to sell aluminum cans to the citrus concentrate industry is starting to pay off.

Reynolds and Minute Maid Corp. announced jointly that in the 1960-61 packing season all the standard 6-oz cans used at Minute Maid's Auburndale, Fla., plant will be aluminum.

The total will be about 50 million.

Updated Forecast — David Reynolds, executive vice president of Reynolds, predicts now that by 1961 nearly all frozen fruit concentrates in the U. S. will be in aluminum cans. Back in May Mr. Reynolds predicted aluminum would be the kingpin in the Florida citrus belt in two years. So he is broadening and updating his forecast.

Mr. Reynolds has good grounds for his optimism. He is now negotiating with several other Florida citrus concentraters for something similar to the Minute Maid setup.

New Areas?—A significant point in this latest development: It indicates that the Reynolds plan for taking over the citrus market is well conceived, and will work. And the approach can be applied to other food processing industries.

A Reynolds spokesman said that the next target may be the canned fish industry. It, like citrus concentrates, is seasonal and regional.

Cost Cutting—The core of the Reynolds approach has been to actually hook up the can making equipment to the processors' line. The cans are then made from flat, printed bodies; tops and bottoms, as they are needed. This means literally no finished inventory. And shipping the aluminum blanks is considerably cheaper than shipping finished cans.

Another advantage claimed by Mr. Reynolds for aluminum orange juice cans: "By switching from tinplate to aluminum cans, a concentrate packer can reduce freight costs by an average of $1 per thousand cans for national distribution."

Varied Opinions—The other aluminum producers view Reynolds' move with mixed attitudes. "Sure we want to see more aluminum used in cans," says one spokesman. "But we don't want to go into the can making business."

Both Alcoa and Kaiser have been pressing the sale of the aluminum can through the major canmakers. The Reynolds approach literally takes business away from the canmakers.

Kaiser generally believes the future of the aluminum can probably lies in the deep-drawn can made in volume by canmakers. But the company is also active in the conventional three-piece aluminum can.

Alcoa has done some radical experimental and developmental work on use of aluminum for cans. The company is well satisfied with its progress to date, and expects to be ready to talk about this soon.

Alcoa Increases Prices

Aluminum Co. of America has raised prices of most mill products and certain sizes and grades of ingots. The prices went into effect Aug. 1.

Primary aluminum prices remain unchanged.

The increases are estimated to average between one-half to three-quarters cents a lb. Alcoa says the adjustments are directly related to increased labor benefits of 11.5¢ an hour. The increased benefits also became effective last Monday.

Reynolds Metals Co. and Kaiser Aluminum and Chemical Sales Inc. have the price increases under official study, company spokesmen say. However, it is expected that both companies will follow the pattern set by Alcoa in the very near future.

Tin prices for the week. July 27—104.75; July 28—104.625; July 29—104.625; Aug. 1—104.625; Aug. 2—104.625*.

* Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in JULY based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	33.00
Copper, Lake	33.00
Straits, Tin, New York	103.494
Zinc, E. St. Louis	12.90
Lead, St. Louis	11.80
Aluminum ingot	28.10

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date o change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/56
Titanium sponge	150-160	162-182	8/1/58
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 151.**

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Muntz Metal	53.20	.....	48.26	.....
Momm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.10	.....

Free Cutting Brass Rod..... 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.. $ 1.31
Cobalt, 97-99% (per lb) ....$1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York .....$210 to $212
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz..$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.).....91.375
Thorium, per kg. $43.00
Vanadium .....$ 3.65
Zirconium sponge .....$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type)...28.00-29.00
No. 12 alum. (No. 2 grade)....24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)....25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 25.25-26.25
- Grade 2—92-95% 24.00-25.00
- Grade 3—90-92% 23.00-24.00
- Grade 4—85-90% 22.50-23.50

(Effective Aug. 2, 1960)

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28½
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20½	20
Free cutting rod ends.	21¾	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27½
- No. 2 copper wire 25½
- Light copper 23¼
- *Refinery brass 23½
- Copper bearing material 22½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27¼
- No. 2 copper wire 25½
- Light copper 22
- No. 1 composition 21
- No. 1 comp. turnings 20½
- Hvy. yellow brass solids 16
- Brass pipe 15
- Radiators 17

Aluminum

- Mixed old cast. ..... 13½—14
- Mixed new clips ..... 15 —15½
- Mixed turnings, dry ..... 14 —14½

Dealers' Scrap

(Dealers' Buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 23 —24
- No. 2 copper wire ..... 21½—22
- Light copper ..... 19½—20
- Auto radiators (unsweated).. 13¼—13⅝
- No. 1 composition ..... 18 —18½
- No. 1 composition turnings... 16½—17
- Cocks and faucets ..... 13¾—14¼
- Clean heavy yellow brass ... 12¾—13¼
- Brass pipe ..... 14¼—14¾
- New soft brass clippings .... 14¼—14⅝
- No. 1 brass rod turnings .... 13¼—13¾

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24s) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7¼— 7¾
- Hand picked type shells ..... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,C4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective Aug. 2, 1960)

STEEL PRICES

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		SHEETS									WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Coke* 1.25-lb. base box	Electro** 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.825 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.825 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

? Electrogalvanized sheets.

(Effective Aug. 2, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5 675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7. 625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Aug. 2, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (18 gage)††	Hot-Rolled		Standard Structurals	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.37	9.71	10.16	10.78	8.94	9.63	9.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	.....	.....	.....
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.72	10.35	10.30	10.89	8.56	9.06	8.70	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	8.89	10.41	10.35	11.21	8.94	9.62	9.02	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.72[1]	10.13	11.39	11.01	8.80	9.45	8.81	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.98	10.61	10.65	11.26	8.93	9.62	9.01	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	10.03	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.29	18.30	17.35	22.90	22.20
Memphis**	.15	9.99	10.20	.....	11.39	10.27	10.48	10.07	12.89	.....	.....	.....	.....
Milwaukee**	.15	8.86	10.49	10.44	11.03	8.70	9.28	8.84	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia**	.10	8.95	10.10	10.76	10.95	9.30	9.95	9.35	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.72	10.13	11.28	10.99	8.56	9.06	8.70	11.40	17.10	16.10	19.70	20.45
Portland**		10.20	12.05	12.35	12.20	10.35	10.80	10.20	16.65	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.92	10.75	10.68	11.09	8.77	9.29	8.92	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.74	10.99	11.16	8.83	9.33	8.97	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 64"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅛" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Aug. 1, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	50*
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Aug. 1, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford. Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼"*).*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $280 per net ton

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Weirtland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*6.25	.....	*2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.35
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.35
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	33.00
Neville, Is., Pa.	30.75

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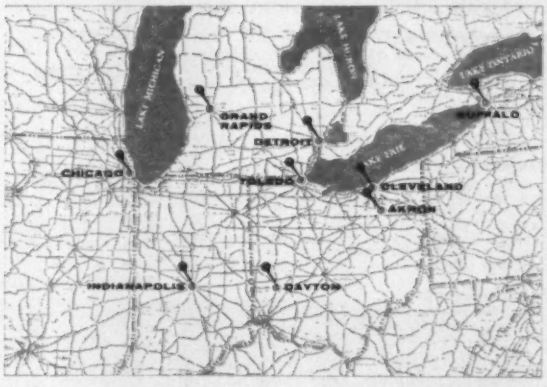

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FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	32.75
0.05% C....	33.50	1.00% C....	32.50
0.10% C....	33.25	1.50% C....	32.25
0.20% C....	33.00	2.00% C....	32.00

3-5% C, 58-63% Cr, 2.5% max. Si... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 31.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	24.50	14.60
Ton lots	29.75	16.05
Less ton lots	31.35	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 75 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	.. $98.00	$96.00	$100.50
19-21%	.. 100.00	98.00	102.50
21-23%	.. 102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective Aug. 1, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound
Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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Electric Power Equipment — A. C. Motors

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579B8	4800	1800
1	1500	G.E.	MT	6000	1187
1	800	Whse.	CW	500	1775
1	800	G.E.	MT-428	2200	450
1	650	Whse.	CW	220/440	900
1	600	Whse.	CW-4-32D-15	440	1775
1	550	Whse.	CW	440	252
1	500	Whse.	CW	550	350
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP581	2300	1800
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Cr.Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-13B	220	1800
3	200	Whse.	CW-890	2300	1775
1	200	G.E.	IM	440	435
1	150	G.E.	IM-17	440	435
1	200	G.E.	IM	2200	580
1	125	G.E.	MT-557	220/440	1200
3	100	A.C.		440	695

SQUIRREL CAGE

1	500	G.E.	FT-559AY	2200	3600
2	500	Whse.	CSP-583H	440	3600
1	500	Whse.	CS-1115	2300	863/445
4	500	Whse.	CS-1216	2200	500
3	450	Hl.	F-3910	2200	1200
1	400	Whse.	CS-7151 610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
1	250	Whse.	CS-8758	2200	1775
1	200	Whse.	CSP-5818	440	3450
2	200	Whse.	CS-8558 D.P.	220/440	1750
1	200	Whse.	CS-873C	2200	1160
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
2	100	Whse.	CS-760C	2200/440	1100
1	100	Whse.	B.B.CS-60T-220/440		1780

SYNCHRONOUS

1	6000	G.E.	ATI.8	200/6600	600
1	3500	G.E.	TS 1.0 4600/2300/4000		360
2	1750	G.E.	ATI	2300	3600
1	700	G.E.	TS.8P.F.	2300	1200
1	400	G.E.	TS-7563H	2200	1200
2	350	G.E.	ATI 1.0P.F.	2300	150
1	325	G.E.	ATI 1.0P.F.	140	1800
3	300	El Mach.	BRKT	2200	1200

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SLIP RING MOTORS

3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1**	5000	Ideal	Mill	6600/4160	440
1**	2500	G.E.	Mill	2300	294
1**	2500	G.E.	Mill	6600/4160	257
1**	1800	Whse.	Mill	2300	352
1**	1750	Whse.	Mill	2300	224
1**	1500	Al.Ch.	Mill	2300	508
1**	1800	Al.Ch.	Mill	2300	353
1**	1200	Al.Ch.	Mill	2300	505
1**	900	Al.Ch.	Mill	2300	189
1*	700	Whse.	CW-1234A	2300	585
1	500	Al.Ch.	ANY	2300	1175
1	500	Ideal	S-4-20	4800	705
1*	500	Al.Ch.	ANY	2200	505
1**	500	Al.Ch.	ANY	2300	393
1*	400	Al.Ch.	ANY	2300	585
1	400	Whse.	CW	2300	290
3	350	G.E.	I-M	2200	1180
1	300	G.E.	IE-15B	440	1200
1	300	Whse.	CW-1012	2200	704
1	250	Whse.	CW	4100/2400	710
1	250	Cr.Wh.	SR size Q	4600/2300	350
1	250	G.E.	MT-414	2200	300

**—Heavy duty, pedestal bearing, stator shifting bases.

*—Heavy duty, pedestal bearing, standard base.

OUTDOOR CIRCUIT BREAKERS

Qu.	Amps.	KV	Make	Type	Int. Cap.
			(Air—3-Pole)		
3	1200	14.4	G.E.	ARA	1000 M.V.A.
3	1200	5	G.E.	AM	100 M.V.A.
			(Oil—3-Pole)		
1	400	73	Whse.	G-11	500 M.V.A.
1	600	69	G.E.	FK-339	500 M.V.A.
1	600	37	G.E.	FHKO-236	500 M.V.A.
1	400	37	G.E.	FHKO-136	250 M.V.A.
1	600	34.5	Al.Ch.	FZO-50-34X	250 M.V.A.
1	600	7.2	G.E.	FKO-227	50 M.V.A.

Transformer & Switchgear Package

3—833-KVA Allis-Chalmers Transformers, 1 ph., 60 cy., 13475/12375-11000/10175-V. Prim., 2300/4000-V. Secondary

1—G.E. Mag. outdoor O.C.B., type F.L.O., 600 amps., 14.4-KV, 250-MVA, Int. cap.

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Second Quarter Shows Improvement

Figures released for the second quarter showed an increase in sales.

Dealers seem to agree that the third quarter is starting with a better tone. Only time will tell.

■ Actually the black picture painted by used machine dealers in June wasn't really too dark. But it wasn't bright either.

As the second quarter neared an end, there were many frowning dealers. Pittsburgh dealers were saying that "inquiries are down and orders are worse." Sales in Ohio were lower than predicted.

In June, New York used machine business was said to be remaining "about the same as the beginning of the year." Business in California was slow and sales "spotty."

Sales Increase—Figures recently released by the Machinery Dealers National Assn. showed an increase in dollar sales. As compared to June, 1959, sales were up 4.5 pct. The dollar value of inventories was up 20.8 pct.

But this, of course, does not present the entire picture. June sales were down 4.2 pct after May. Inventories were up 1.7 pct.

These figures cover only used machinery sales where the ultimate user of the equipment was invoiced. This does not include, for example, sales to other dealers. New machinery sales, domestic or foreign, were not included.

A Drop — Though the overall sales picture for June was up slightly, the number of machine tools invoiced at more than $200 was down. When compared to June, 1959, there was a drop of 6.3 pct. Compared to May, the drop was 8.4 pct.

Looking at the second quarter picture, there was an increase here too. Sales were up 2.7 pct over the second quarter of 1959.

Sales during the first quarter, however, were down 11.6 pct from the same period last year.

Actually, 1960's second quarter was the second best of the previous eight years. In 1957 sales for this period were 1.3 pct higher. Other years, 1958 for example, show second quarter sales as much as 33.9 pct lower.

Most dealers around the country agree that the third quarter is starting on a slightly better note. July was referred to as a "good" month in New York.

Need Hustle—A dealer on the national level said recently, "There's business to be had but you have to hustle for it." Another dealer feels a need for more aggressive salesmen saying "the day of the order taker is past."

West Coast dealers are looking for a healthy setup in business during the next few months. Machine tools in heavier sizes have been selling moderately well lately. Inquiries have been high and the sales outlook has become somewhat brighter. This is especially true in the fabricating business.

All in all, June and the second quarter was down but not fruitless. Now dealers are preparing for what they hope will be a third quarter upswing.

PRESSES

STAMPING & FORGING EQUIPT.

1300-Ton Nat'l. Maxipres, 80 SPM, 10" Str., 1955
920-Ton Toledo #60, Bed 47x72, Stroke 20", 1943
700/390-Ton Toledo #797E, Bed 127x83, Dbl. Act. Toggle Air Clutch & Cushion
600-Ton Ferracute E601, Coining, 6" Str. 30 SPM, Mfg. '50, Bed 37x36, 1950
440-Ton Bliss #210, Bed 37x36, 35 SPM, Side Shear, Stroke 16", Mfg. 1953
440-Ton Toledo #59¼, Bed 41x48, Stroke 12"
255-Ton Bliss #208, Bed 30x54, Str. 8"
255-Ton Toledo 58½B, Bed 43x42, Stroke 12"
150-Ton Clearing E2150, Bed 45x36, Str. ⅜"
150-Ton Cleve. 60-D-84, Bed 86x46, Stroke 14"
88-Ton Toledo #7 OBI, Str. 6", 30 SPM
3000# Chambersburg "Ceco Drop" Hammers, 1951

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1—3½" & 8½" x 5½" STRIP MILL, 4-high.
2—28" 3-HIGH ROLL STANDS.
1—18" 3-HIGH BAR MILL, single stand.
1—NEW 16" BAR MILL, 3-high, single stand.
1—10" BAR MILL with motor and gear drive.
1—9" BAR MILL 3-high five stands.
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1—OPEN SIDE BAR SHEAR Williams & White No. 14½, 1¾" round.
1—SHEAR, 1" x 110" plate.
1—LEVELLER, 1" x 104" plate.
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1—POINTER, tube 2" O.D. x ¼" wall maximum.
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1—1200 HP GEAR DRIVE, 295 to 30 RPM.
1—1200 HP GEAR DRIVE, 353 to 94.5 RPM.
1—600 HP GEAR DRIVE, 1.088 to 1.
1—400 HP GEAR DRIVE, 8.2 to 1.
1—800 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR, 440 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR 2300/4600 volts 3 phase 60 cycle 450 RPM.

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6'-19" col. Carlton, m.d., 1943
7'-16" col. American Triple Purpose, m.d.
6'-17" col. American Hole Wizard, m.d.
Baush Radial Drilling & Tapping Machine, m.d.

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No. 2 Avey, m.d.
No. 2LMS Leland & Gifford, m.d., H.S.
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No. 4MS Leland & Gifford H.S., 4 speed A.C., m.d. to spindle.
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Approx. Max. Taper 19"
Min. Roll Die Dia. 10½"
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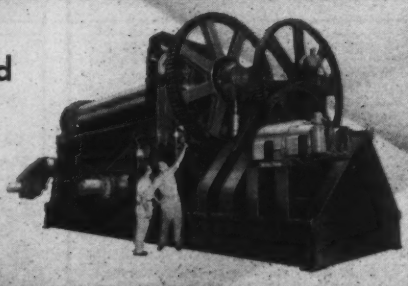

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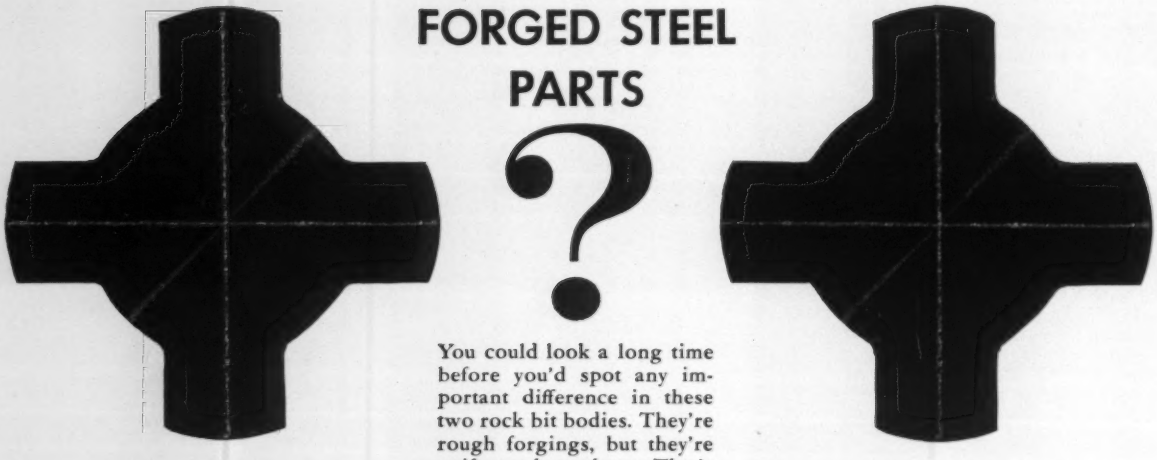

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